Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

10/19/2018

Certified Mail

Yes	TOXIC REVIEW
Yes	PSD
No	SYNTHETIC MINOR TO AVOID MAJOR NSR
Yes	CEMS
Yes	MACT/GACT
Yes	NSPS
Yes	NESHAPS
No	NETTING
No	MAJOR NON-ATTAINMENT
Yes	MODELING SUBMITTED
Yes	MAJOR GHG
No	SYNTHETIC MINOR TO AVOID MAJOR GHG

Jack Payne
PTTGCA Petrochemical Complex
2800 Post Oak Blvd., Suite 2401
Houston, TX 77056

RE: DRAFT AIR POLLUTION PERMIT-TO-INSTALL
Facility ID: 0607135004
Permit Number: P0124972
Permit Type: Initial Installation
County: Belmont

Dear Permit Holder:

A draft of the Ohio Administrative Code (OAC) Chapter 3745-31 Air Pollution Permit-to-Install for the referenced facility has been issued for the emissions unit(s) listed in the Authorization section of the enclosed draft permit. This draft action is not an authorization to begin construction or modification of your emissions unit(s). The purpose of this draft is to solicit public comments on the permit. A public notice will appear in the Ohio Environmental Protection Agency (EPA) Weekly Review and the local newspaper, The Times Leader. A copy of the public notice and the draft permit are enclosed. This permit can be accessed electronically on the Division of Air Pollution Control (DAPC) Web page, www.epa.ohio.gov/dapc by clicking the "Search for Permits" link under the Permitting topic on the Programs tab. Comments will be accepted as a marked-up copy of the draft permit or in narrative format. Any comments must be sent to the following:

Andrew Hall
Permit Review/Development Section
Ohio EPA, DAPC
50 West Town Street, Suite 700
P.O. Box 1049
Columbus, Ohio 43216-1049

and

Ohio EPA DAPC, Southeast District Office
2195 Front St.
Logan, OH 43138

Comments and/or a request for a public hearing will be accepted within 30 days of the date the notice is published in the newspaper. You will be notified in writing if a public hearing is scheduled. A decision on issuing a final permit-to-install will be made after consideration of comments received and oral testimony if a public hearing is conducted. Any permit fee that will be due upon issuance of a final Permit-to-Install is indicated in the Authorization section. Please do not submit any payment now. If you have any questions, please contact Ohio EPA DAPC, Southeast District Office at (740)385-8501.

Sincerely,

Michael E. Hopkins, P.E.
Assistant Chief, Permitting Section, DAPC

Cc: U.S. EPA Region 5 - *Via E-Mail Notification*
Ohio EPA-SEDO; Pennsylvania; West Virginia

STAFF DETERMINATION FOR THE APPLICATION TO CONSTRUCT UNDER THE PREVENTION OF SIGNIFICANT DETERIORATION REGULATIONS FOR PTTGC AMERICA PETROCHEMICAL COMPLEX DILLES BOTTOM, OHIO PERMIT NUMBER P0124972

The Clean Air Act and regulations promulgated thereunder require that major air pollution sources undergoing construction or modification comply with all applicable Prevention of Significant Deterioration (PSD) provisions and nonattainment area New Source Review requirements. The federal PSD rules govern emissions in attainment areas for major stationary sources, which are sources with the potential to emit 250 tons per year or more of any pollutant regulated under the Clean Air Act, or 100 tons per year or more if the source is included in one of 28 source categories. In nonattainment areas, the definition of major stationary source is one having at least 100 tons per year potential emissions. A major modification is a change resulting in a contemporaneous increase in emissions which exceeds the significance level of one or more pollutants. Any changes in actual emissions within a five-year period are considered to be contemporaneous. In addition, Ohio now has incorporated the PSD and NSR requirements by rule under OAC Chapter 3745-31.

Both PSD and nonattainment rules require that certain analyses be performed before a facility can obtain a permit authorizing construction of a new major stationary source or major modification to a major stationary source. The principal requirements of the PSD regulations are:

1. Best Available Control Technology (BACT) review - A detailed engineering review must be performed to ensure that BACT is being installed for the pollutants for which the new source is a major source.

2. Ambient Air Quality Review - An analysis must be completed to ensure the continued maintenance of the National Ambient Air Quality Standards (NAAQS) and that any increases in ambient air pollutant concentrations do not exceed the incremental values set pursuant to the Clean Air Act.

For nonattainment areas, the requirements are:

1. Lowest Achievable Emissions Rate (LAER) - New major stationary sources must install controls that represent the lowest emission levels (highest control efficiency) that has been achieved in practice.

2. The emissions from the new major source must be offset by a reduction of existing emissions of the same pollutant by at least the same amount, and a demonstration must be made that the resulting air quality shows a net air quality benefit. This is more completely described in the Emission Offset Interpretative Ruling as found in Appendix S of 40 CFR Part 51.

3. The facility must certify that all major sources owned or operated in the state by the same entity are either in compliance with the existing State Implementation Plan (SIP) or are on an approved schedule resulting in full compliance with the SIP.

For rural ozone nonattainment areas, the requirements are:

1. LAER - New major sources must install controls that represent the lowest emissions levels (highest control efficiency) that has been achieved in practice.

2. The facility must certify that all major sources owned or operated in the state by the same entity are either in compliance with the existing SIP or are on an approved schedule resulting in full compliance with the SIP.

Finally, New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAP), Maximum Achievable Control Technology (MACT), SIP emission standards and public participation requirements must be followed in all cases.

SITE DESCRIPTION

The facility will be located at the former site of the R.E. Burger Power Plant in unincorporated Dilles Bottoms, in Mead Township which is in Belmont County, Ohio. This area is classified as attainment for carbon monoxide (CO); nitrogen oxides (NO_x); sulfur dioxide (SO_2); particulate matter (PM) with a diameter equal to or less than 10 microns (PM_{10}); PM with a diameter equal to or less than 2.5 microns ($PM_{2.5}$); ozone; and lead (Pb).

FACILITY DESCRIPTION

PTTGC America LLC (PTTGCA) is proposing to construct a world-scale petrochemical complex (hereinafter "the Facility") composed of an ethylene plant and ethylene-based derivatives plants to manufacture high-density polyethylene (HDPE) and linear low-density polyethylene/HDPE (LLDPE/HDPE) with onsite rail and truck loading and supporting utilities, infrastructure, and other facilities outside battery limits (OSBL). The design capacities of the process units are:

- Ethylene Plant (Ethane Cracker Unit or ECU): 1,500 KT/year
- HDPE Units: two (2) trains of 350 KT/year for each train
- LLDPE/HDPE Units: two (2) trains of 450 KT/year for each train

Associated utilities infrastructure and logistics: utilities systems, storage tanks, logistics facilities, and off-sites facilities to produce and/or provide the required natural gas, water, air, nitrogen, steam, electricity, to support the operation of process units.

Emissions of PM, PM_{10}, $PM_{2.5}$, CO, NO_x, VOC and greenhouse gases (GHGs) from the proposed facility will be subject to PSD requirements.

PROJECT DESCRIPTION

The Facility will convert ethane feedstock into ethylene by the process of "thermal cracking" with steam. Ethylene produced will be used in the manufacturing of the ethylene-based derivatives of HDPE and LLDPE/HDPE. HDPE will be manufactured using a liquid-phase slurry polymerization process. The Facility will consist of the following air emission units:

- Six (6) ethane cracking furnaces;
- Three (3) natural gas-fired steam boilers;
- One (1) ethylene manufacturing unit;
- Two (2) HDPE manufacturing units;
- Two (2) LLDPE/HDPE manufacturing units;
- Two (2) OSBL thermal oxidizers;
- One (1) high pressure ground flare;
- One (1) low pressure ground flare;
- Equipment and process unit leaks (facility-wide);
- One (1) wastewater treatment plant with one (1) primary and (1) backup thermal oxidizer;
- One (1) heavy and light pygas railcar loading operations;

- Two (2) HDPE railcar loading operations;
- Facility roadways and parking areas;
- Two (2) emergency firewater pumps;
- Four (4) emergency generators;
- One (1) cooling tower; and
- Non-process storage tanks.

Ethane Cracking Furnaces

The Facility involves a total of six (6) furnaces, all operating in parallel except when one (1) furnace is in decoking, HSSB mode or maintenance. Each of the cracking furnaces will have a maximum firing capability of approximately 552 MMBtu/hr Higher Heating Value (HHV). Emissions from the cracking furnace stacks will result from combustion of methane, hydrogen, and natural gas during normal operation, start-up/shutdown, decoking, and HSSB mode. The cracking furnaces will be equipped with low NO_x burners and selective catalytic reduction (SCR) for control of nitrogen oxide (NO_x) emissions. The following describes the different operating modes for the furnaces:

Start-up/Shut down: Start-up Mode is defined as the period beginning when fuel is introduced to the furnace and ending when the SCR catalyst bed reaches its stable operating temperature. A planned start-up for each furnace is limited to 24 hours at 25% or less of the maximum allowable firing rate. Since there is no process-generated tail gas available during start-up, natural gas will be used as fuel with ethane as back-up fuel if there is an interruption in natural gas supply. Shutdown Mode is defined as the period beginning when the SCR catalyst bed first drops below its stable operating temperature and ending when the fuel is removed from the furnace.

Normal Operating Mode: Normal operation of six (6) furnaces in parallel for ethylene production. During normal operations, the furnaces will use tail gas as primary (about 85 %) fuel and natural gas as supplement fuel (about 15%). If there is an interruption in natural gas supply, then ethane will be used as supplement fuel. Under normal conditions, about 65% of ethane feed is converted to ethylene and other by-products.

Decoking Mode: During the cracking process, there is coke formation inside the furnace tubes that requires periodic decoking for efficient cracker operation. Every 45 to 60 days a furnace will go through decoking, which will last approximately 36 hours. The coke build-up is removed during this mode of operation. The heat input rate required during decoking is about 30% of the furnace's normal heat input. Once a furnace has been decoked, it is placed into hot steam standby HSSB or normal operation.

Hot Steam Stand-by (HSSB) Mode: Once a furnace has been decoked, it is placed into HSSB mode. During this mode, the furnace has steam flowing through the furnace at its minimum firing rate which is only about 20-25% of the furnace's normal heat input. In a typical operating cycle of a cracker, this mode only lasts for about 4 hours before it is ready for normal operations. The furnace discharge in this mode shall be routed to the firebox for oxygen freeing and then to the quench tower.

Maintenance Mode: Although decoking is considered periodic maintenance for the cracker, there may be process upsets that can damage the cracker and the cracker will be shut down. This period is referred to as the maintenance mode. During this mode, the furnace will be cold and there will not be any fuel consumption.

For short term (hourly maximum) emission calculations during normal operations, assume six (6) furnaces will be operating at normal capacity. For long term (12 month rolling average) emission calculations, assume each furnace operates 8,580 hours at normal capacity and 180 hours in decoking mode which also includes both HSSB and maintenance. Cracker emissions for startup/shut down cases will be handled separately as a part of start-up/shutdown emissions. For startup and shutdown emission calculations, the entire ethane cracker plant (including only one of the six furnaces) is assumed to undergo one start-up/shutdown cycle per year for 24 hours.

Utility Steam Boilers

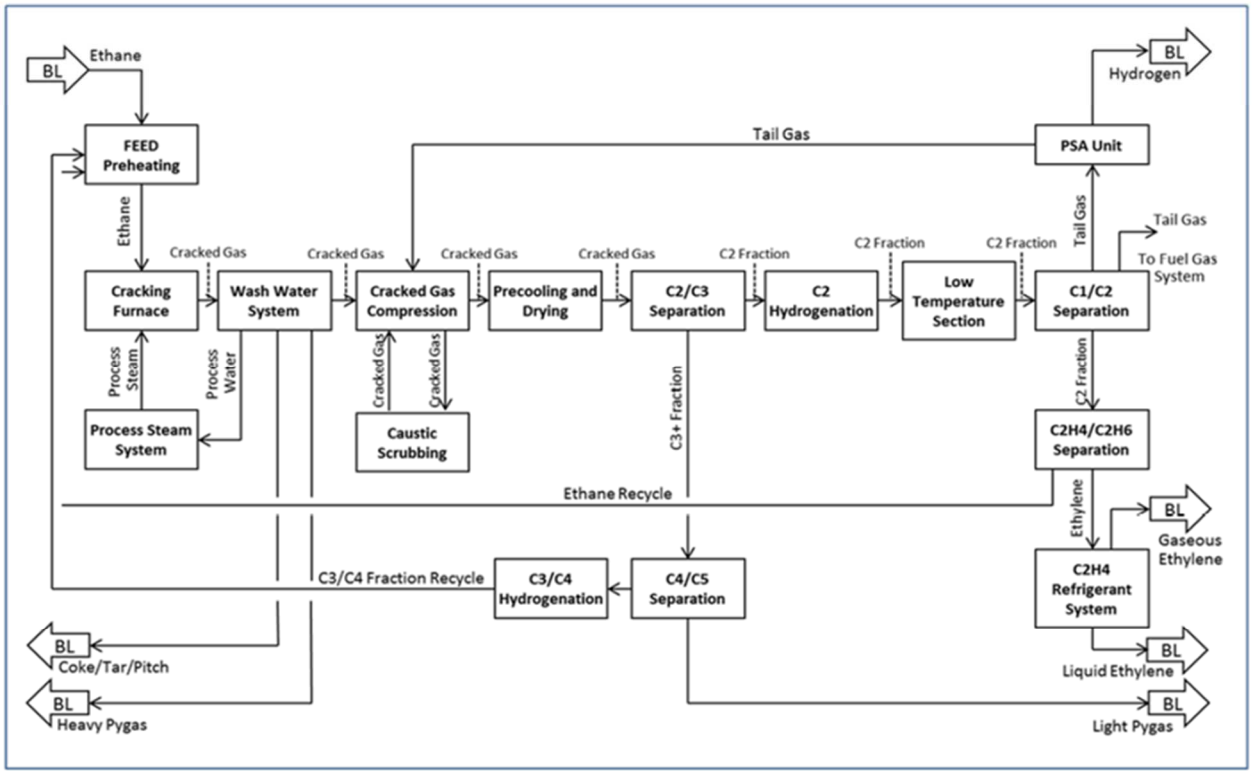
Three (3) natural gas fired steam boilers, with ethane as back-up fuel, will supply the plant-wide steam header system at a level of 600 psig (high pressure (HP) steam). The super-heated, very high pressure (VHP) steam will be produced in the Ethane Cracker to provide motive power to the cracked gas compressor at a level of 1,550 psig. During normal operation, HP steam is generated from the ethane cracker extraction turbine and the utility steam boilers. During plant start-up, HP steam will be supplied to the ECU only by the utility steam boilers in the OSBL area.

Ethylene Manufacturing Unit

Cracking is a process in which large hydrocarbon molecules are broken down into smaller molecules. The industrial method for producing lighter alkenes, such as ethylene and propylene, is via steam cracking. Steam cracker units are facilities in which a feedstock such as ethane is thermally cracked using steam in pyrolysis furnaces to produce lighter hydrocarbons. The products obtained depend on the composition of the feed, the hydrocarbon-to-steam ratio, the cracking temperature, and furnace residence time. Typically, the reaction temperature is very high, around 1,500°F. The purpose of the Ethane Cracker Unit (ECU) is to produce polymer grade ethylene, pure hydrogen, and two gasoline products (heavy pygas and light pygas). In addition, a mix of oil/tar/coke will be a by-product of the cracking process. Figure 3-1 (from the facility permit application) presents a simplified process flow diagram of the ethylene manufacturing process.

Feed Preheating

Figure 3-1 Ethylene Manufacturing Process



The feedstock is purified in an ethane filter and a portion is sent to the ethane dryers. The dried portion of the feedstock is used to maximize heat integration in the ECU by providing chilling duty and is combined with recycle streams from downstream process units. The remaining (wet) portion of the feed stock is preheated with process heat and combined with a mixture of dried feedstock and recycle streams before being routed to the furnaces.

Cracking Furnace Tie-In

The furnaces are arranged in a single row with a common pipe rack and with supply headers for ethane feed gas from the feed preheating unit and utility streams (process steam, boiler feed water, fuel gas, decoking air and chemicals). Cracked gas, very high-pressure steam, and blow down water leave the furnace section via headers on the pipe rack to the downstream systems.

Cracking, Quenching

The cracking furnace section consists of six (6) identical cracking furnaces for cracking ethane. All six furnaces will be producing ethylene with one furnace at a time periodically taken off line for decoking, hot steam standby (HSSB), and maintenance. Each cracking furnace consists of three main sections: radiant section, quench exchanger system and convection section.

The cracking reactions take place in radiant coils in the radiant section and form the desired components in the cracked gas. Low NOx burners (LNB) provide the required heat

input. During normal operation the burners are supplied with tail gas from the separation section consisting mainly of methane and hydrogen with some make-up natural gas to match the required fuel gas demand. In the event of an interruption of natural gas supply, ethane will be used as a backup source of fuel.

In the three-stage quench exchanger system downstream of the radiant section, the cracked gas is rapidly cooled down, thus minimizing unfavorable secondary reactions and maximizing heat recovery. The transferred heat produces saturated super high-pressure steam and preheats the boiler feed water. Downstream of the quench exchanges, the cracked gas is routed to the quench water tower.

In the convection section, waste heat in the flue gas from the radiant section is transferred to process and utility streams, thus achieving high overall energy efficiency for the cracking furnaces. The ethane feed gas is preheated, mixed with process steam, and superheated in the convection section before entering the radiant section. Boiler feed water is pre-heated and super high-pressure steam is superheated in the convection section. At each furnace the flue gases leaving the convection section are routed to one dedicated stack by an induced draft fan. The furnaces are equipped with individual NO_x control systems (i.e. selective catalytic reduction (SCR) for removal of NO_x emissions).

During decoking operation of a furnace, the decoking gases are routed to a cyclone to separate the coke from the effluent gases. Each furnace is equipped with its own dedicated cyclone. The effluent gases from the cyclone are further routed to the firebox of the same furnace for thermal destruction, resulting in lower emissions of particulates and carbon monoxide during decoking operation. The mixture of decoking gas and flue gas is routed through the convection section and leaves the furnace through the same dedicated stack per furnace.

Wash Water System (Quench Water Tower)

In the quench water (QW) tower, the cracked gas is cooled down to ambient temperature. Heavy gasoline (heavy pygas) and process steam are condensed. The purified and cooled cracked gas leaving the top of the column is fed to the compression section. Circulating quench water is withdrawn from the bottom of the column and pumped to several consumers for maximum heat recovery. Excess water and heavy pygas are separated by gravity in a series of separation drums, a filter, and a coalescer. The water is cleaned in the process steam system and subsequently reused as dilution steam. Solid components (mix of oil/tar/coke) are removed from the process water by gravitational deposition for offsite beneficial use or disposal. The heavy pygas is routed to onsite storage before being shipped offsite as a by-product.

Process Steam System

The excess process water from the quench water tower is fed to the process water stripper, where dissolved volatile hydrocarbons are stripped off. The overhead of the stripper is recycled to the quench water column. The stripped process water from the process stripper bottoms is vaporized and superheated by condensing medium pressure steam, and subsequently injected into the ethane feedstock and pre-heated in the convection section of the furnace before entering the radiant section of the cracking furnaces. Additionally, part of the process water is discharged as blowdown to the process wastewater treatment system.

Cracked Gas Compression

The overhead from the QW tower is fed to a cracked gas compression system which uses a five- stage centrifugal compressor. A caustic scrubbing step is located between the 4th and 5th stage to remove sour gas components from the cracked gas. The gas from the 4th

stage discharge is then fed to caustic wash system before it goes to final cracked gas compression. The gas from the 5th stage compressor is then fed to the precooling and drying process.

Caustic Scrubbing

The removal of acid components carbon dioxide (CO_2) and sulfuric acid ($H2_S$) occurs by means of three-stage caustic scrubbing in a column. The cleaning is required to meet the CO_2 and H_2S concentrations in the ethylene product specifications, to prevent CO_2 solidification in downstream cold unit, and to protect the hydrogenation catalyst from H_2S poisoning. The cleaning is performed in the lower sections of the caustic scrubber. The upper trays of the column (water washing section) are charged with boiler feed water to prevent entrainment of caustic soda to the 5th stage of the cracked gas compressor.

Fresh caustic is supplied at 50 wt. % and diluted by boiler feed water injection to 20 wt. %. The solution is stored upstream of the caustic dosing pump, under nitrogen blanket, in a drum with a vent to atmosphere in a safe location. Level control is provided to prevent the exit of caustic material. The resulting vent stream is composed primarily of nitrogen with traces of water.

Spent Caustic Treatment System

Spent caustic from the ECU will be sent to the spent caustic storage tank. Feed pumps send the spent caustic to the spent caustic oxidizers for treatment using steam and compressed air to oxidize sulfur compounds under pressure and heat. Oxidized spent caustic is sent to a separator to separate the liquid from the non-condensable, which is routed to the OSBL TOXs. The liquid oxidized caustic is neutralized with sulfuric acid and sent to a degassing drum, from where the released gas is sent to the OSBL TOXs. The oxidized and neutralized spent caustic is then pumped to the Wastewater Treatment Plant (WWTP) for treatment.

Precooling and Drying

After compression, the cracked gas is cooled down in several steps. After removal of the heavy hydrocarbon components, the cracked gas is passed through a molecular sieve drier where water is removed to parts per million (ppm) levels. Afterwards, the dry cracked gas is further cooled against ethane recycle, ethane fresh feed, cold methane and hydrogen fraction (tail gas), and other cold streams. During plant start-up when cold streams are not enough to cool dried cracked gas, propane refrigerant can be used as an alternative coolant.

C_2/C_3 Separation

The different gaseous and liquid hydrocarbon fractions from the precooling section are directed to the ethane (C_2)/propane (C_3) separation unit for separation into two fractions, one containing all C_2 and lighter components and one containing all C_3 and heavier components. The C_2/C_3 separation unit consists of a dual column system operated at two pressure levels. The overhead product is routed to C_2 minus-hydrogenation, while the bottom product is directed to the debutanizer column for butane (C_4)/pentane (C_5) separation.

C_2 Acetylene Hydrogenation

The overhead product of the C_2/C_3 separation is sent to the catalytic selective hydrogenation process to remove acetylene. This hydrogenation takes place in an isothermal tubular reactor. The reactor tubes are filled with the catalyst. On the shell side

of the reactor, methanol is vaporized in a closed loop to remove the heat of the exothermic reaction.

Low Temperature Section

In the low temperature section, the C_2-minus fraction is cooled in several stages until almost all ethylene and ethane are condensed. The remaining tail gas consists of mostly hydrogen and methane. This tail gas is mainly used as fuel for the furnaces. A small hydrogen rich fraction is sent to the dihydrogen (H_2) purification step which delivers the pure hydrogen product.

C_1/C_2 Separation

The condensed C_2-minus fraction from the low temperature section is fed to methane (C_1)/C_2 separator, where the light components methane and hydrogen are recovered overhead. The bottom C_2 fraction is fed to C_2H_4/C_2H_6 separation.

(1) **C_2H_4/C_2H_6 Separation**

The bottom product of C_1/C_2 separation is fed to C_2H_4/C_2H_6 separation, where it is split into ethylene as an overhead product and an ethane fraction at the bottom. The operation of the column is based on the heat pump principle, whereby the column's top gas is compressed in the third stage of the ethylene compressor and liquefied in the reboiler (i.e., re-boiling the column bottoms), before returning to the column as reflux. The bottom product of the C_2H_4/C_2H_6 separation, consisting of the ethane fraction, is vaporized and heated to ambient temperature thereby recovering the cooling energy to several appropriate consumers. The gaseous ethane is further superheated by waste heat from the wash water cycle and recycled to the cracking furnaces.

Ethylene Refrigerant Cycle

The ethylene refrigeration cycle represents an open loop system. It generates the flux for the C_2H_4/C_2H_6 separation, supplies the ethylene coolant for the low temperature section and C_1/C_2 separation, and compresses the ethylene product to the required pressure. Intermediate cooling is provided by cooling water as well as by the integrated feed preheating.

C_4/C_5 Separation

The C_3+ stream from C_2/C_3 separation is routed to C_4/C_5 separation. There, it is separated into a C_3/C_4 fraction and a C_5+ fraction. The C_3/C_4 fraction is routed to the C_3/C_4 hydrogenation section to reduce its olefinic content (specifically 1,3-butadiene and propylene), before being recycled to the furnace as feed. The C_5+ fraction (light pygas) from the column bottoms is routed to a storage tank before being shipped offsite as a by-product.

C_3/C_4 Hydrogenation

The C_3/C_4 fraction from C_4/C_5 separation is routed to C_3/C_4 catalytic selective hydrogenation to convert 1,3-butadiene and propylene. This hydrogenation takes place in a single stage adiabatic reactor. A high recycle flowrate back to the reactor inlet is used to control the temperature rise across the reactor.

Propane Refrigerant Cycle

The propane refrigeration closed cycle serves for cooling in the intermediate temperature range between cooling water and ethylene refrigerant. The propane vapors are

compressed by a three-stage propane compressor. PSA Hydrogen Purification: High purity hydrogen is generated in the pressure swing adsorption hydrogen purification unit. Impurities in the hydrogen-containing stream are selectively adsorbed and high-purity hydrogen product is obtained. The remaining tail gas is returned to the cracked gas compressor.

HDPE Manufacturing Units

The HDPE unit will include two duplicate trains (PE 1 and PE 2). The process operates at low temperature and pressure. Polymerization takes place in a slurry loop reactor system where the polymer particles grow while suspended in an inert light hydrocarbon diluent which contains a mixture of ethylene, hydrogen and co-monomer. Polymer slurry is withdrawn from the reactor and the HDPE powder is separated from the hydrocarbon diluent and un-reacted monomers. These hydrocarbons are recycled to the reactors via a simple recovery system. HDPE powder leaves the reactor then enters a degassing system to remove remaining traces of diluent before being transferred to the finishing sector. The HDPE polymerization and finishing processes are one single, continuous process unit. In the finishing sector, the powder is mixed with additives and is pelletized. The pellets are then homogenized and transferred to the logistics area. Figure 3-2 (from the facility permit application) presents a simplified process flow diagram for the HDPE manufacturing process.

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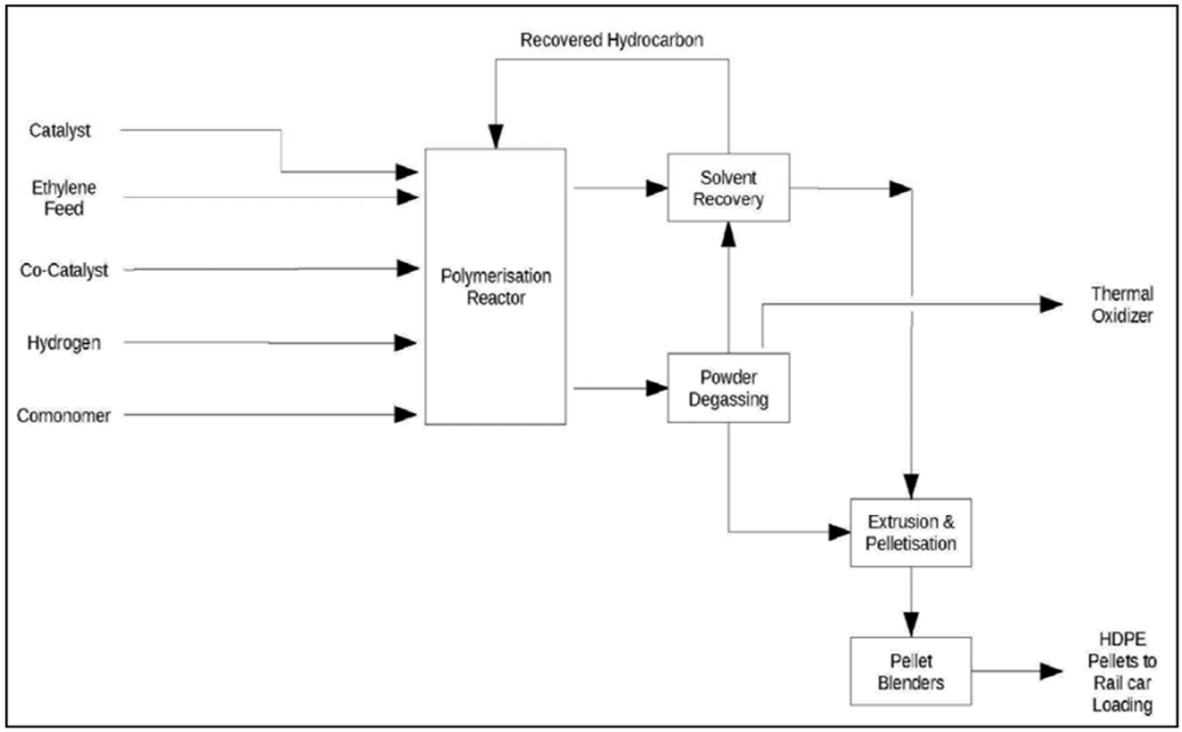
Figure 3-2 High Density Polyethylene Manufacturing Process



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eds to the HDPE process are ethylene, co-monomer (1-butene or 1-hexene), hydrogen, and light hydrocarbon diluent (i-butane). Ethylene is the main reagent in the production of HDPE resin; it is used as monomer in reactor. The co-monomer is used with the aim of controlling resin density. Hydrogen is used for controlling the melt index of polyethylene.

Catalyst Activation and Feed Systems

The process will use catalysts (Ziegler type catalyst or chromium-based catalysts) to manufacture polyethylene. The Ziegler type catalyst can be directly used for catalyst preparation while chromium-based catalyst must be activated by heat. The catalyst activation unit is designed to oxidize the chromium-based catalyst in a controlled way to create active catalyst which imparts specific molecular structure to the polymer in the reactor. The unit operates in batch mode. The catalyst will be transferred from its container in to the catalyst slurry tank. The catalyst is then mixed with a diluent to make catalyst slurry that is then pumped to the reactor.

Co-catalyst Feed

Alkyl metals are used as co-catalyst. They are colorless liquids and pyrophoric materials. Nitrogen is used to transfer co-catalyst from the on-site delivery containers to the cocatalyst feed pot.

Reactor System

The reactor is based on the slurry loop principle. The reaction takes place in an Isobutane diluent. Ethylene is dissolved in the diluent. Catalyst, co-catalyst, co-monomer and hydrogen are also fed into the reactor. Within the reactor the dissolved ethylene “grows” into a white powder. The slurry from the second reactor is discharged to a withdrawal system. The slurry is then heated up to the solvent vaporization temperature prior to discharge to the high-pressure separator.

Solvent (Diluent) Recovery

Slurry is withdrawn from the reactor and the HDPE powder is separated from the hydrocarbon diluent and un-reacted monomers. These hydrocarbons are recycled to the reactors in a simple recovery system. In this process there are two diluents recycle systems: high pressure solvent recovery (HPSR) and low-pressure solvent recovery (LPSR). Nearly all of hydrocarbon recovery/recycle occurs in the HPSR system. The high-pressure separator makes the main separation between vaporized hydrocarbon and powder. The HDPE powder is transferred to the low-pressure system. The LPSR system collects all overheads process gas from the powder degassing unit and separates light gases from hydrocarbons for recovery.

Powder Degassing and Powder conveying

HDPE powder leaves the reactor into a degassing system to remove trace diluent and is then transferred to the finishing sector. Once the powder leaves the primary separation step, residual monomer, co-monomer and diluent are further removed from the powder. Degassed powder is pneumatically transferred to finishing.

Additives and Pelletizing

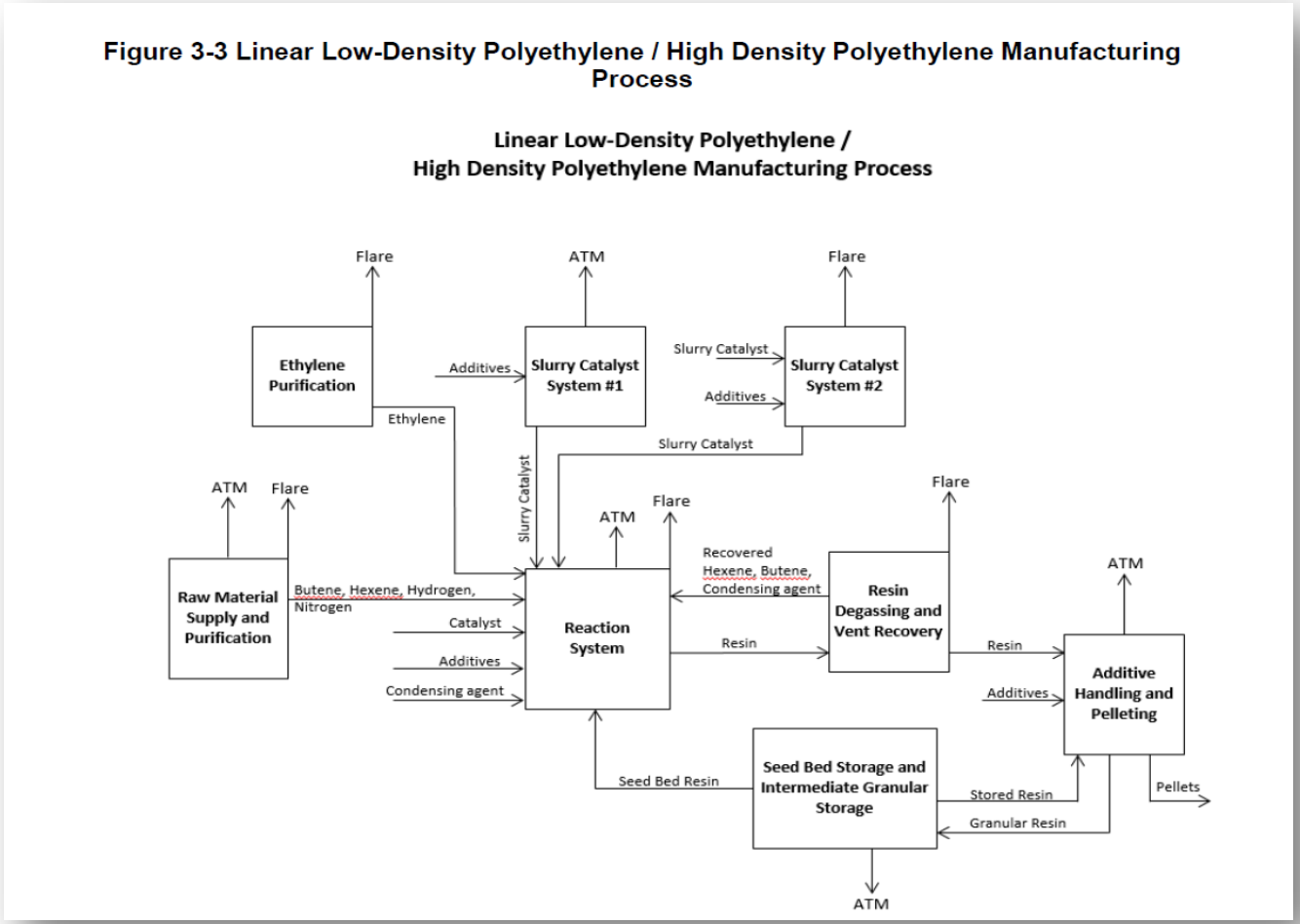
In the additives and pelletizing section, virgin powder (i.e., resin) from the polymerization section is received and blended with additives for extrusion and pelletizing. Pellets are extruded from the pelletizer and cut under water. Then the pellets are separated from the water and dried in the pellet dryer. The pellets are collected in a hopper before being pneumatically conveyed to pellet blending silos. From the blender, the pellets are transferred to silos for loading into railcars.

LLDPE/HDPE Manufacturing Units

The LLDPE/HDPE unit will include two duplicate trains (PE 3 and PE 4). The primary feeds to the polyethylene process are ethylene, co-monomer and hydrogen. PE plants 3 and 4 use gas phase technology that is designed to produce different grades of linear low-density polyethylene (LLDPE) and HDPE polymers from polymer grade ethylene.

PE plants 3 and 4 will consist of the following process steps: ethylene purification, raw material supply and purification, catalyst system, reactor system, resin degassing and vent recovery, granular resin seed bed storage system and additive handling and pelleting. Figure 3-3 (from the facility permit application) presents the simplified process flow diagram LLDPE/HDPE manufacturing process. The following is a brief description of the proposed LLDPE/HDPE manufacturing processing steps and systems.

Figure 3-3 Linear Low-Density Polyethylene / High Density Polyethylene Manufacturing Process



Ethylene Purification

Fresh ethylene flows through a series of purifiers where trace quantities of impurities are removed. The purifiers are vented to either the OSBL thermal oxidizer, HP ground flare or LP ground flare before and during regeneration. The fresh ethylene is injected into the reaction systems.

Raw Materials Supply and Purification

Butene or hexene as well as induced condensing agent are passed through a degassing column and then flow through purifiers to remove impurities and are injected into the reaction system. Hydrogen is injected directly into the reaction system. Nitrogen is passed through a series of purifiers where trace quantities of impurities are removed. The purifiers are vented to one of the flare systems, before and during regeneration. A portion of nitrogen is compressed and is then routed to the reactor. The remaining nitrogen is used throughout the plant. Additives are routed directly to the reactor.

Reaction Systems

The reaction system consists of a fluidized bed reactor, a cycle gas compressor and cooler and product discharge tanks. Ethylene, raw materials (butene, hexene, hydrogen, additives, nitrogen, and induced condensing agent), and catalyst and slurry catalysts are fed continuously to the reactor. Polyethylene resin is removed from the reactor and is separated from most of the small amount of gas accompanying it in the discharge tank. The separated gas is fed back to the reactor. A mixture of resin and residual gas is then sent to resin degassing and vent recovery. Dry catalyst may use additive which is routed directly to the reactor.

Slurry catalyst in system #1 is prepared by mixing precursor additive with other additives. The prepared catalyst is transferred to the reaction system. The vessels vent to a disposal tank and seal pot to prevent catalyst release to the atmosphere. The slurry catalyst in system #2 is prepared by mixing a precursor slurry catalyst with an additive. The prepared slurry catalyst is transferred to the reaction system. The vessels vent to a disposal tank and knock-out pot to prevent catalyst release to one of the flare systems. An additive is routed directly to the reactor for use with the slurry catalyst.

Resin Degassing and Vent Recovery

Resin from the reactor is conveyed to a purge bin where the dissolved hydrocarbons and recovered gases (hexene, butene, and induced condensing agent) are stripped from the resin and returned to the process. Excess gas not used in the process is vented to one of the flare systems. Resin from the purge bins flows to additive handling and pelleting.

Additive Handling and Pelleting

Resin and additives are metered by feeders and flow to the pelleting system. The additives and resins are thoroughly mixed, melted and pelleted in the pelleting system. The product pellets are dried, cooled, and conveyed to the blending silos for blending. The blended pellets are transferred to the loading silos for loading into railcars.

Granular Resin Conveying and Storage

A portion of the resin from the additive handling and pelleting system can be sent to seed bed bins or intermediate bins (granular resin). When needed, the stored resin can be conveyed to the reaction system (seed bed resin) or back to the additive handling and pelleting area.

Flares and Thermal Oxidizers

The project design includes two flares and four thermal oxidizers (TOX) for handling process vents, tank farm and truck/railcar vapors and blowdown and emergency reliefs at different operating conditions throughout the plant. These systems are:

- One HP ground flare
- One LP ground flare
- Two OSBL TOX; only 1 operating at a time, the other is for back-up

- Two wastewater treatment (WWT) TOX; only 1 operating at a time, the other is for back-up

The systems receive flammable, toxic, and hazardous reliefs from process units during normal, emergency, upset and start-up/shutdown conditions. The systems further separate the liquids from the vapor and uses combustion to reduce the hydrocarbons to the flare for destruction. Under normal operations, most of the continuous and intermittent vents from the process units and OSBL area are sent to the TOX; however, there are a few streams from the Cracker and HDPE and LLDPE/HDPE process units that will be routed to either the HP or LP ground flare. The HP ground flare will be equipped with smokeless multiport burners with the first stage steam assisted. The LP ground flare will be equipped with smokeless multi-burners with all tips steam assisted. Both flares will be situated inside a fenced flare enclosure. Natural gas with ethane as backup will be provided for continuous pilot and purge for both flares. The TOXs will be fueled by natural gas with ethane as backup fuel source. Two (2) waste water treatment thermal oxidizers (WWTTOXs) will be provided for the control and destruction of VOC sources at the wastewater treatment plant.

Equipment and Process Unit Leaks (facility-wide)

Fugitive emissions of VOC and greenhouse gases (GHGs) from leaks associated with equipment such as valves, pumps, connectors, flanges, and other piping components are being addressed as a separate emission source for efficient permitting structure.

Wastewater Treatment Plant

There will be several wastewater streams that will be generated as part of normal plant operations. These are classified as process wastewater, drains and sanitary wastewater. The wastewater treatment plant is designed to treat as many waste streams onsite as possible; however, there are some streams that will be sent for offsite disposal. Wastewater such as demineralized waste, cooling tower blowdown, and stormwater run-off do not require treatment and will be discharged directly to the Ohio River. The wastewater treatment plant consists of oily water treatment plant, process biological treatment plant and sanitary treatment plant. Waste streams containing oil as the primary contaminant will be sent to the oily water treatment system while those which have high levels of organics will be routed to the process biological wastewater treatment system. Sanitary waste collected from the buildings will be sent to the sanitary treatment plant for treatment.

Raw Material Unloading and Product Loading

Raw materials such as caustic, sulfuric acid, 1-hexene, 1-butene, i-butane, i-pentane, propane refrigerant will be unloaded via railcars and trucks. Unloading spouts for railcars and trucks will be required for unloading these consumables. Hoses will be installed at each unloading spout and a nitrogen fill will be available as needed. Each consumable unloading station will be equipped with a pump for moving product from the railcar/truck to a storage tank. The HDPE and LLDPE/HDPE products, light pygas and heavy pygas will be shipped offsite via rail; there are two loading points each for the HDPE and LLDPE/HDPE products, and one loading point each for light pygas and heavy pygas. Each loading station for a liquid product will have a vapor return connected to a header for carrying exhaust vapors to a product tank or the OSBL TOX. Individual loading arms are provided for each specific liquid raw material and product to avoid contamination.

Facility Roadways and Parking Areas

Plant roadways and parking areas will be paved and implement the best management practices of speed control, water spraying, and sweeping to control emissions of fugitive dust.

Emergency Firewater Pumps

The Facility will utilize two (2) diesel-fired reciprocating internal combustion engines to power emergency firewater pumps. The firewater pump engines are rated at 402 BHP (300 kW) each and will burn ultra-low sulfur diesel (ULSD).

Emergency Generators

Four (4) diesel-fired reciprocating internal combustion engines will be utilized at the Facility for emergency power generation purposes. The engines will burn ULSD and are rated at the following capacities:

- One (1) generator rated at 2,500 kW (3,353 HP); and
- Three (3) generators rated at 1,000 kW (1,341 HP) each.

Cooling Tower

Recirculating closed loop cooling water systems will be used as the cooling medium for the petrochemical complex. One multi-cell, counter flow, mechanical draft cooling tower will be used to exchange heat with the atmosphere. The cooling tower will provide cooling water for the ECU, HDPE trains, LLDPE/HDPE trains and the OSBL equipment. The multi-cell, induced-draft counter-flow evaporative cooling tower is designed to provide flexibility in cooling water requirements of the plant.

This system includes a 22-cell cooling tower, cooling water circulation pumps, chemical storage and injection systems etc. The cooling tower (CT) will be designed to include a side stream filtration system for removal of suspended solids from the cooling water which leads to less fouling in the system. This will help in optimizing overall system performance. Utility water (clarified filtered water) is used as cooling water (CW) makeup to compensate for evaporative and blowdown losses of the CW. The cooling tower blowdown from the system will be sent to the bio-treatment check basin for mixing with the plant's other wastewater streams before discharge to the Ohio River. During the winter months, a portion of the CT blowdown will be mixed with the equalized process wastewater before being sent to the process wastewater biological treatment aeration tank. This is required to maintain water temperature and biological activity within the aeration tank.

Storage Tanks

The Facility will utilize non-process tanks for the storage of organic material. The tanks listed in the following table will be subject to applicable requirements. The table also identifies the control that will be applied for each subject tank.

3. Tank	4. Control
5. Ethylene Rundown Storage Tank	6. High-pressure flare with a minimum 98.0% destruction efficiency
7. Light Pygas Storage Tank 1	8. Thermal oxidizer with a minimum 99.5% destruction efficiency
9. Light Pygas Storage Tank 2	10. Thermal oxidizer with a minimum 99.5% destruction efficiency
11. Heavy Pygas Storage Tank 1	12. Thermal oxidizer with a minimum 99.5% destruction efficiency

13. Heavy Pygas Storage Tank 2	14. Thermal oxidizer with a minimum 99.5% destruction efficiency
15. Off-Spec Ethylene Storage Bullets	16. High-pressure flare with a minimum 98.0% destruction efficiency
17. Spent Caustic Storage Tank	18. Thermal oxidizer with a minimum 99.5% destruction efficiency
19. Spent Caustic Storage Standby Tank	20. Thermal oxidizer with a minimum 99.5% destruction efficiency
21. 1-Butene Storage Bullets	22. Thermal oxidizer with a minimum 99.5% destruction efficiency
23. 1-Hexene Storage Tank	24. Thermal oxidizer with a minimum 99.5% destruction efficiency
25. i-Butane Storage Bullet	26. Thermal oxidizer with a minimum 99.5% destruction efficiency
27. Propane Storage Bullet	28. High-pressure flare with a minimum 98.0% destruction efficiency
29. i-Pentane Storage Bullet	30. Thermal oxidizer with a minimum 99.5% destruction efficiency
31. Ethylene Rundown Storage Tank	32. High-pressure flare with a minimum 98.0% destruction efficiency
33. Light Pygas Storage Tank 1	34. Thermal oxidizer with a minimum 99.5% destruction efficiency

All of the non-process organic storage tanks at the facility qualify as exempt sources based on a “de minimis” level of potential emissions as outlined in OAC rule 3745-15-05 or based on the tank permit exemptions in OAC rule 3745-31-03(B)(1)(l). The remaining de minimis or permit exempt storage tanks are not subject to any applicable requirements.

NEW SOURCE REVIEW (NSR)/PSD APPLICABILITY

The Facility will generate significant levels of criteria pollutant emissions including NO_x, SO_2, CO, VOC, PM, PM_{10}, $PM_{2.5}$ and GHGs. As shown in the table below, except for SO_2, the PSD major source threshold is exceeded for CO, NO_x, VOC, PM, PM_{10} and $PM_{2.5}$. The calculated PTE from the plant also exceeds 100,000 tpy of CO_2e and CO_2. Since the GHG emissions will exceed the 100,000 tpy CO_2e "subject to regulation" threshold and the 100 tpy threshold for CO_2 on a mass basis, Major New Source/PSD review is also required for GHGs. Non-Attainment New Source Review was not applicable, due to attainment status.

Summary of Proposed Potential Emissions and Applicable Regulatory Thresholds

Pollutant	Annual Emissions (tpy)	PSD Major Source Threshold (tpy)	PSD Significar Emission Rat (tpy)	PSD Applies? (Yes/No)
PM	120	100	25	Yes
PM_{10}	89	100	15	Yes
$PM_{2.5}$	86	100	10	Yes
SO_2	23	100	40	No
NO_x	164	100	40	Yes
CO	544	100	100	Yes
VOC	396	100	40	Yes
H_2S	<1	100	7	No
Lead	Negligible	100	0.6	No
CO_2e	1,785,043	100	75,000	Yes

BACT REVIEW

As part of the application for any source regulated under the PSD requirements, an analysis must be conducted that demonstrates that Best Available Control Technology will be employed by the source. In this specific case, the BACT analysis was conducted for PM, PM_{10}, $PM_{2.5}$, NO_x, CO, VOC, and GHGs. Each pollutant will be reviewed separately.

The application used a "top-down" approach to determine an appropriate level of control.

The basic steps to be followed are:

1) Identify all available potential control options;
2) Eliminate technically infeasible options;
3) Rank remaining technologies by control effectiveness;
4) Evaluate the feasible controls by performance and cost analysis; and
5) Select BACT

Cracking Furnaces - BACT Analysis for NOx

NO_x formed during combustion results from either thermal reactions, fuel-bound nitrogen reactions, or prompt NO_x. Below is a description of all formation mechanisms:

- Thermal NO_x formation: The thermal NO_x mechanism was first proposed by Zeldovich and involves radicals to produce the overall reaction of combining oxygen and nitrogen. A series of chemical reactions occur in which oxygen and nitrogen present in the combustion air dissociate and react to form NO_X. Above 2,800°F, thermal NO_x formed through Zeldovich mechanism is an exponential function of combustion temperature and a linear function of residence time. When the combustion temperature is lower than 2,800 °F, the rate of NO_x formation decreases significantly. Reducing combustion temperature is commonly used in practice to reduce thermal NO_x emissions. This application will address thermal NO_x reduction due to its significant contribution to the total NO_x.

- Fuel bound NO_x formation: When nitrogen-containing fuel is burnt, the nitrogen content of the fuel is liberated and then participates in NO_x reactions in the combustion chamber. Since natural gas or fuel gas will be used as fuel for the proposed furnaces, fuel-bound nitrogen is considered a minor contributor to overall NO_x emissions. Therefore, this BACT evaluation will not address techniques that reduce fuel-bound nitrogen.

- Prompt NO_x: This mechanism was first discovered by C.P. Fenimore in 1971. Prompt NO_x is formed near the flame zone and demonstrates less temperature dependence than those formed through the Zeldovich mechanism discussed above. Near the flame zone, radicals such as O and OH enhance the rate of NO_x formation. Some NO_x, therefore, will form despite aggressive controls on flame temperature and oxygen concentration. Hence although prompt NO_x contributes less to the amount of NO_x released by conventional combustors, it contributes a more notable percentage to the NO_x produced by combustors using low/ultra-low NO_x burners.

NO_x control strategies for cracker furnaces may be classified as pre-combustion control, combustion control, and post-combustion control (flue gas treatment). Pre-combustion control strategies typically involve switching to other fuels with lower nitrogen contents or removing nitrogen from the fuel with a treatment technology. The permit application does not address pre-combustion control strategies due to the fact that the proposed cracking furnaces will be fueled by natural gas and fuel gas, which does not contain significant amount of nitrogen, and the majority of the NO_x formed during the combustion of fuel gas and natural gas is due to combustion air nitrogen. Combustion control techniques employ fuel or air staging that affect the kinetics of NO_x formation by reducing the peak flame temperature or introduce inerts (combustion products, for example) that limit initial NO_x formation by lowering the available O_2, or both.

Post-combustion NO_x control techniques use various chemicals to reduce NO_x emissions by converting the NO_x to elemental nitrogen before released to the atmosphere. The chemical reactions occur with or without a catalyst.

Identification of Control Options

All previously approved BACT for ethane cracking furnaces have been a combination of low NO_x burners (LNBs) and selective catalytic reduction (SCR), which is the top ranked control technology and has the highest NO_x reduction efficiency.

The current low NO_x burner technology being used in a typical boiler or process heater can achieve NO_x emission rates of 0.04 pound per million Btu (lb/MMBtu) or less. However, the LNBs installed in cracking furnaces do not achieve the same reductions as achieved by the LNBs that can be installed in process heater and boiler applications. Low NO_x burners typically have smaller-diameter burner tips and are therefore more susceptible to plugging. For cracking furnaces, plugging could result in flame impingement and uneven heating which could lead to thermal shock as well as coil elongation (creep). Thus, the LNBs designed for cracking furnaces considers the operational and maintenance issues unique for this type of furnaces.

Search of RBLC Determinations

The search of the RBLC and other available permits revealed two facilities located in attainment areas – Formosa Plastics Corporation Olefins Plant and Sasol North America Inc, Lake Charles Chemical Complex. The permitted BACT emission rates for these two facilities are 0.012 lb/MMBtu (rolling 12-month basis for normal operation) and 0.02 lb/MMBtu (30-day rolling average), respectively. The short-term emission limits permitted for Formosa is an hourly emission limit of 0.025 lb/MMBtu for normal operation while for Sasol, a 3-hr average of 0.1 lb/MMBtu for startup/shutdown/maintenance and a 3-hr average of 0.18 lb/MMBtu for decoking were imposed.

BACT Determinations

The installation of LNB and SCR on the six ethane cracking furnaces meeting the NO_x limits presented in the following table is proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	NO_x Emission Limits for each furnace	Control Technology
Normal	Tail gas and natural gas with ethane back-up	0.010 lb/MMBtu as a 12-month rolling average; 0.0135 lb/MMBtu as an hourly maximum	LNB and SCR
		7.45 lbs/hr	
Startup, Shutdown, HSSB	Tail gas and natural gas with ethane back-up	0.050 lb/MMBtu as a three-hour average	LNB without SCR
		27.60 lbs/hr	
Decoking	Natural gas with ethane back-up	0.015 lb/MMBtu as a three-hour average	LNB and SCR
		2.18 lbs/hr	

BACT also includes the establishment of an annual limitation not to exceed 144.00 tons per rolling 12-month period from all six cracking furnaces combined.

Cracking Furnaces - BACT Analysis for CO

Emissions of CO from the furnaces result from incomplete fuel combustion. CO will form under non-ideal operating conditions such as low combustion temperatures, insufficient residence time, and low oxygen levels due to inadequate mixing and/or low air-to-fuel ratio in the combustion zone.

Identification of Control Options

Potentially available control technologies for CO emissions from cracking furnaces fired with low-sulfur fuel gas include good burner design and the use of oxidation catalyst. A properly designed firebox and burner together will effective operating control will minimize CO generation by providing proper residence time, temperature, and combustion zone turbulence, as well as proper air-to-fuel ratio. Regarding the use of oxidation catalyst, no cracking furnaces are known to be equipped with CO oxidation catalyst. Additionally, no applicable CO standards have been promulgated for cracking furnaces under 40 CFR Parts 60, 61, and 63.

Search of RBLC Determinations

The search of the RBLC and other available permits indicate that good combustion practices was selected as BACT for all the cracking furnaces previously permitted. The RBLC search also revealed that BACT limitations during normal operation mode was exclusively 0.035 lb/MMBtu on hourly and annual basis. Alternative BACT limits on an hourly mass rate were authorized for non-normal operation modes such as startup/shutdown/decoking due to the different operation conditions encountered during those transitional operation periods.

BACT Determinations

Proper burner design achieving the following limitations is being proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	CO Emission Limits for each furnace	Control Technology
Normal, Startup, Shutdown and HSSB	Tail gas and natural gas with ethane backup	0.035 lb/MMBtu as a rolling, 12-month average	Proper burner design and good combustion practices
		19.32 lbs/hr	
Decoking	Natural gas with ethane backup	5.08 lbs/hr	Proper burner design and good combustion practices

BACT also includes the establishment of an annual limitation not to exceed 500.00 tons per rolling 12-month period from all six cracking furnaces combined.

Cracking Furnaces - BACT Analysis for VOC

VOC emissions from furnaces result from incomplete fuel combustion. If not completely combusted, the heavier molecular weight components of the natural gas with ethane as back-up will generate VOC emissions. Thus, combustion practices that promote high combustion temperature, long residence times at those temperatures, and turbulent mixing of fuel and combustion air minimize VOC emissions.

Identification of Control Options

Potentially available control technologies for VOC emissions from cracking furnaces fired with low-sulfur tail gas and natural gas (with ethane backup) include good combustion practices and the use of an oxidation catalyst. Further review of the RBLC entries indicates that good combustion practices was selected as BACT for all the cracking furnaces previously permitted. A properly designed firebox and burner together will effective operating control will minimize VOC generation by providing proper residence time, temperature and combustion zone turbulence, as well as proper air-to-fuel ratio. PTTGCA is not aware of any cracking furnaces equipped with VOC oxidation catalyst. No applicable VOC standards have been promulgated for cracking furnaces under 40 CFR parts 60, 61and 63, which serves the basis of the BACT.

Search of RBLC Determinations

The search of the RBLC and other available permits indicate that good combustion practices was selected as BACT for all the cracking furnaces previously permitted. Most of the identified facilities in the RBLC are in O_3 non-attainment areas, while two facilities are in attainment areas – Formosa Plastics Corporation Olefins Plant and Sasol North America Inc. Lake Charles Chemical Complex. The permitted BACT emission rates for these two facilities are 0.003 lb/MMBtu (normal operation, no average time indicated) and 0.008 lb/MMBtu (3 1-hr test run average; confirmed in Sasol permit), respectively. The short- term emission limits permitted for Formosa include an hourly emission limit of 0.0108 lb/MMBtu during startup/shutdown

BACT Determinations

Proper burner design and good combustion practices achieving the following limitations is being proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	VOC Emission Limits for each furnace	Control Technology
All	Tail gas and natural gas with ethane backup	0.008 lb/MMBtu as a rolling, 12-month average	Proper burner design and good combustion practices
		4.42 lbs/hr	

BACT also includes the establishment of an annual limitation not to exceed 114.00 tons per rolling 12-month period from all six cracking furnaces combined.

Cracking Furnaces - BACT Analysis for PM, PM_{10} and $PM_{2.5}$

Emissions of particulate matter resulted from gaseous fuel combustion which include filterable PM and condensable PM. Filterable PM are the particles directly emitted as a solid or liquid at stack or release conditions and captured on the filter of a stack test train; condensable PM are formed in the atmosphere due to condensation/or reaction of the vapor upon cooling and dilution in the atmosphere immediately after released from the stack. Filterable PM and condensable PM are both primary PM. It has been estimated that PM resulted from gaseous fuel combustion is less than 1 micron in equivalent aerodynamic diameter. Because the particulate matter typically is less than 2.5 microns in diameter, this BACT discussion assumes the control technologies for PM, PM_{10}, and $PM_{2.5}$ are the same. So throughout this BACT analysis, all forms of PM are referred to as "PM".

The source of particulate matter from gaseous fuel-fired sources such as cracking furnaces include:

- Inert solids contained in the combustion air;
- Unburned fuel hydrocarbons resulting from incomplete combustion which agglomerate to form particles and condensable/secondary particulates; and
- Release of additional PM emissions during decoking due to the cleanup of the coke build-up.

Identification of Control Options

Potentially available control technologies for PM emissions from cracking furnaces fired with low-sulfur fuel gas include use of post-combustion control technologies such as cyclones, electrostatic precipitators, baghouses, and wet gas scrubbers, proper burner design and good combustion control practices, recycling of decoking vents back into the firebox and use of natural gas fuel only. No applicable PM standards have been promulgated for cracking furnaces under 40 CFR Part 60, 61, and 63.

Search of RBLC Determinations

A search of the RBLC and other available permits for cracking furnaces indicates that no sources are applying post-combustion control. Generally, the approved BACT includes proper design, good combustion practice, and use of "clean" fuels. A review of the RBLC database and available permits identified recycling the decoking vent stream back into the furnace firebox as PM control during this process. In addition, proper design and operation of the Pyrolysis Furnaces according to the manufacturer's recommendations will minimize the amount of coke generated.

BACT Determinations

Proper burner design and good combustion practices achieving the following limitations is being proposed as BACT for the Facility along with the recycling of the decoking vent stream back to the furnace and limiting decoking events:

Operation Mode	Fuel Combusted	PM Emission Limits for each furnace	Control Technology
All modes except decoking	Tail gas and natural gas with ethane backup	PM – 0.005 lb/MMBtu and 2.76 lbs/hr $PM_{10}/PM_{2.5}$ – 0.005 lb/MMBtu and 2.76 lbs/hr	Proper burner design and good combustion practices
Decoking	Tail gas and natural gas with ethane backup	PM – 0.019 lb/MMBtu and 2.76 lbs/hr $PM_{10}/PM_{2.5}$ – 0.010 lb/MMBtu and 1.45 lbs/hr	Good combustion and operating practices to limit the decoking event of each cracking furnace to maximum of 10 times a year (totally 360 hours per year each furnace) and recycling of decoking vent stream to furnace firebox

BACT also includes the establishment of the following annual limitations for all six cracking furnaces combined:

- 72.59 tons of PM per rolling, 12-month period; and
- 71.89 tons of $PM_{10}/PM_{2.5}$ per rolling, 12-month period.

Cracking Furnaces - BACT Analysis for GHGs

The cracking furnaces will generate three GHGs during the combustion process: methane (CH_4), carbon dioxide (CO_2), and nitrogen oxide (N_2O). If the cracking furnaces are properly designed, the dominating GHG produced is CO_2. CH_4 emissions result from incomplete fuel combustion and N_2O emissions are due to partial oxidation of nitrogen in the air which provides the oxygen required for the combustion process. Since CO_2 emissions account for approximately 99% of the total CO2e emissions, this GHG BACT analysis is focused on controlling CO_2 emissions.

Identification of Control Options

The following resources were reviewed to identify potential technologies to GHG emissions from the cracking furnaces:

- USEPA's RBLC Clearinghouse database;
- USEPA, PSD and Title V Permitting Guidance for Greenhouse Gases, March 2011. Available at http://www.epa.gov/sites/production/files/2015-07/documents/ghgguid.pdf;
- USEPA, "Available and Emerging Technologies for Reducing Greenhous Gas Emissions from the Petroleum Refining Industry", 2010. Available at https://www.epa.gov/sites/production/files/2015-12/documents/refineries.pdf;
- USEPA, "Available and Emerging Technologies for Reducing Greenhous Gas Emissions from Industrial, Commercial, and Institutional Boilers", 2010. Available at https://www.epa.gov/sites/production/files/2015-12/documents/iciboilers.pdf;

- Report of the Interagency Task Force on Carbon Capture and Storage, 2010. Available at http://www3.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf.

Based on the review of above resources, the potential GHG control technologies identified for cracking furnaces include the following:

- Use of low carbon gaseous fuels to reduce the amount of GHG produced;

- Use of good operating and maintenance practices such as burner tune-ups, monitoring of operations, etc.;

- Thermal efficiency improvement measures including combustion air controls, installation of heat recovery equipment, insulation, optimization of instrumentation and process controls, installation of condensate return lines, etc.;

- Carbon Capture and Sequestration (CCS). CCS is included in this analysis as a feasible technology per EPA's PSD and Title V Permitting Guidance for Greenhouse Gases (March 2011). The EPA guidance indicates that:

  "For the purposes of a BACT analysis for GHG, EPA classifies CCS as an add-on pollution control technology that is "available" for facilities emitting CO_2 in large amounts, including fossil fuel-fired power plants, and for industrial facilities with high- purity CO_2 streams (e.g., hydrogen production, ammonia production, natural gas processing, ethanol production, ethylene oxide production, cement production, and iron and steel manufacturing). For these types of facilities, CCS should be listed in Step 1 of a top-down BACT analysis for GHGs. This does not necessarily mean CCS should be selected as BACT for such sources. Many other case-specific factors, such as the technical feasibility and cost of CCS technology for the specific application, size of the facility, proposed location of the source, and availability and access to transportation and storage opportunities, should be assessed at later steps of a top-down BACT analysis".

Search of RBLC Determinations

The search of the RBLC and other available permits indicate that BACT was exclusively determined to be good combustion practices and certain energy efficiency improvement measures.

BACT Determinations

An analysis of CCS indicated that it would neither be technically feasible nor cost-effective and as such CCS was not considered as BACT for GHG emission control. The cracking furnaces will employ a furnace design to minimize GHG emissions. Additionally, the plant design was selected based on ethylene yield, reliability, and overall thermal efficiency of the furnaces. The proposed BACT for the Facility is a combination of use of low carbon gaseous fuels, good combustion and operating practices, and pollution prevention means by improving energy efficiency as BACT to reduce GHGs emissions from the cracking furnaces.

- Use of low carbon intensity gaseous fuels
  - Pipeline natural gas used as supplemental fuel
  - Process tail gas used as fuel to maximize thermal efficiency
- Good combusting and operating practices
  - Sufficient residence time to guarantee efficient operation,
  - Properly controlled excess air and sufficient turbulence to support the optimum combustion condition, combustion control system to optimize the oxygen and air

flow to maximize fuel efficiency,
    - Maintenance of all cracking furnaces equipment according to manufacturer's recommended Operations and Maintenance Practice
    - Minimization of the amount of coke generated by proper design and operation of the Pyrolysis Furnaces according to the manufacturer's recommendations
- Efficiency improvement measures to maximize overall unit energy efficiency
    - Burner tune up and regular maintenance program to ensure correct flame pattern/profile;
    - Use of economizers to recover heat from the exhaust gas to preheat incoming steam drum feed water to attain thermal efficiency;
    - Feed preheat to reduce the fuel firing required to initiate the cracking process
    - Insulation of cracking furnaces and piping to reduce heat loss;
    - Reduce of standby losses by proper process design and specification of stable operation for the targeted operating range.

For compliance demonstration, the exhaust flue gas temperature from the furnaces will be monitored. Since the furnace exhaust temperature is a reflection of the combined effects of each of the elements discussed above on overall energy efficiency. A maximum furnace exhaust temperature of 350°F based on a rolling 12-month basis is being established in the permit.

BACT also includes the establishment of an annual limitation not to exceed 1,673,240 tons CO_2e per rolling, 12-month period for each cracking furnace.

Natural Gas Fired Boilers - BACT Analysis for NOx

NO_x formed during combustion results from either thermal reactions, fuel-bound nitrogen reactions, or prompt NO_x. Below is a description of all formation mechanisms:

- Thermal NO_x formation: The thermal NO_x mechanism was first proposed by Zeldovich and involves radicals to produce the overall reaction of combining oxygen and nitrogen. A series of chemical reactions occur in which oxygen and nitrogen present in the combustion air dissociate and react to form NO_x. Above 2,800°F, thermal NO_x formed through Zeldovich mechanism is an exponential function of combustion temperature and a linear function of residence time. When the combustion temperature is lower than 2,800 °F, the rate of NO_x formation decreases significantly. Reducing combustion temperature is commonly used in practice to reduce thermal NO_x emissions. This application will address thermal NO_x reduction due to its significant contribution to the total NO_x.

- Fuel bound NO_x formation: When nitrogen-containing fuel is burnt, the nitrogen content of the fuel is liberated and then participates in NO_x reactions in the combustion chamber. Since natural gas or fuel gas will be used as fuel for the proposed furnaces, fuel-bound nitrogen is considered a minor contributor to overall NO_x emissions. Therefore, this BACT evaluation will not address techniques that reduce fuel-bound nitrogen.

- Prompt NO_x: This mechanism was first discovered by C.P. Fenimore in 1971. Prompt NO_x is formed near the flame zone and demonstrates less temperature dependence than those formed through the Zeldovich mechanism discussed above. Near the flame zone, radicals such as O and OH enhance the rate of NO_x formation. Some NO_x, therefore, will form despite aggressive controls on flame temperature and oxygen concentration. Hence although prompt NO_x contributes less to the amount of NO_x released by conventional combustors, it contributes a more notable percentage to the NO_x produced by combustors using low/ultra-low NO_x burners.

NO_x control strategies for boilers may be classified as pre-combustion control, combustion control, and post-combustion control (flue gas treatment). Pre-combustion control strategies typically involve switching to other fuels with lower nitrogen contents or removing nitrogen from the fuel with a treatment technology. The application did not address pre-combustion control strategies due to the fact that the boilers will be fueled by natural gas or ethane as back-up, which does not contain significant amount of nitrogen, and the majority of the NO_x formed during the combustion of fuel gas and natural gas is due to combustion air nitrogen. Combustion control techniques employ fuel or air staging that affect the kinetics of NO_x formation by reducing the peak flame temperature or introduce inerts (combustion products, for example) that limit initial NO_x formation by lowering the available O_2, or both.

Post-combustion NO_x control techniques use various chemicals to reduce NO_x emissions by converting the NO_x to elemental nitrogen before released to the atmosphere. The chemical reactions occur with or without a catalyst.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, potential NO_x control technologies for boilers/process heaters that would qualify and have been approved as BACT would be low/ultra-low NO_x burners (LNBs/ULNBs) combined with flue gas recirculation (FGR) or selective catalytic reduction (SCR). Selective non-catalytic reduction (SNCR) and $SCONO_x$ catalytic absorption system were also identified as potential control technologies but are not considered technically feasible.

Search of RBLC Determinations

The search of the RBLC and other available permits revealed that for comparable units, the lowest BACT emission limit in all of the permits reviewed is 0.01 lb/MMBtu during normal operation. The entries vary in the determination of the most appropriate averaging period, ranging from an hourly rate to 30-day rolling average to an annual average. As mentioned above approved BACT for gas fired boilers were ULNBs combined with FGR or SCR.

BACT Determinations

SCR provides the highest NO_x removal efficiency, but the application of SCR will cause significant adverse energy and economic impacts and will yield both beneficial and adverse environmental impacts. The adverse energy impact is caused by the electrical requirements of the SCR system operation and the reduction in boiler efficiency due to the pressure drop across the SCR catalyst, for example, potential economizer bypass. Considering the adverse energy and environmental impacts of the SCR system, as well as the condition that the three steam boilers will only burn natural gas, it has been concluded that requiring SCR for the steam boilers cannot be justified and does not represent BACT.

The installation of ULNB and FGR on the three boilers meeting the NOx limits presented in the following table is proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	NOx Emission Limits for each boiler	Control Technology
Normal	Natural gas with ethane backup	0.010 lb/MMBtu as a rolling, 30-day average	ULNB and FGR
		4.00 lbs/hr	
Startup,		0.020 lb/MMBtu	ULNB and FGR

Shutdown	Natural gas with ethane backup	8.00 lbs/hr	

BACT also includes the establishment of an annual limitation not to exceed 8.76 tons per rolling 12-month period from all three boilers combined.

Natural Gas Fired Boilers - BACT Analysis for CO

CO results from incomplete fuel combustion. CO will form under non-ideal operating conditions such as low combustion temperatures, insufficient residence time, and low oxygen levels due to inadequate mixing and/or low air-to-fuel ratio in the combustion zone.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential CO control technologies for boilers/process heaters were identified:

- Catalytic oxidation – installation of catalyst bed in boiler exhaust to reduce CO emissions;
- Proper burner design and good combustion practices – proper burner design to achieve good combustion efficiency;
- Use of natural gas only – natural gas is processed to meet specifications such as methane content and heating value which result in more efficient combustion compared to other fuels.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the options identified above: catalytic oxidation, proper burner design and combustion control, and restrictions to only fire pipeline natural gas. For natural gas fired equipment, proper equipment design and combustion control was the most applied BACT for CO reduction.

BACT Determinations

The use of only natural gas and proper burner design achieving the following limitations is being proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	CO Emission Limits for each boiler	Control Technology
All	Natural gas with ethane backup	0.035 lb/MMBtu as a rolling, 12-month average	Proper burner design, good combustion practices and use of only natural gas with ethane backup
		14.00 lbs/hr	

BACT also includes the establishment of an annual limitation not to exceed 30.7 tons per rolling 12-month period from all three boilers combined.

Catalytic oxidation of CO was evaluated; however, considering adverse energy, environmental, and economic impacts of the catalytic oxidation system (as evidenced that this control technology was not applied in majority of the sources), it was concluded that requiring catalytic oxidation for the steam boilers cannot be justified and does not represent BACT.

Natural Gas Fired Boilers - BACT Analysis for VOC

VOC emissions result from incomplete fuel combustion. If not completely combusted, the heavier molecular weight components of the natural gas will generate VOC emissions. Thus, combustion practices that promote high combustion temperature, long residence times at those temperatures, and turbulent mixing of fuel and combustion air minimizes VOC emissions.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential VOC control technologies for boilers/process heaters were identified:

- Catalytic oxidation – installation of catalyst bed in boiler exhaust to reduce VOC emissions;
- Proper burner design and good combustion practices – proper burner design to achieve good combustion efficiency;
- Use of natural gas only with ethane as backup – natural gas is processed to meet specifications such as methane content and heating value which result in more efficient combustion compared to other fuels.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the options identified above: catalytic oxidation, proper burner design and combustion control, and restrictions to only fire pipeline natural gas. For natural gas fired equipment, proper equipment design and combustion control was the most applied BACT for VOC reduction.

BACT Determinations

The use of only natural gas and proper burner design achieving the following limitations is being proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	VOC Emission Limits for each boiler	Control Technology
All	Natural gas with ethane backup	0.0054 lb/MMBtu	Proper burner design, good combustion practices and use of only natural gas with ethane backup
		2.16 lbs/hr	

BACT also includes the establishment of an annual limitation not to exceed 4.73 tons per rolling 12-month period from all three boilers combined.

Catalytic oxidation of VOC was evaluated, however considering adverse energy, environmental, and economic impacts of the catalytic oxidation system (as evidenced that this control technology was not applied in majority of the sources), it was concluded that requiring catalytic oxidation for the steam boilers cannot be justified and does not represent BACT.

Natural Gas Fired Boilers - BACT Analysis for PM, PM_{10}, $PM_{2.5}$

$PM/PM_{10}/PM_{2.5}$ emissions from gas fired equipment result from unburned fuel hydrocarbons. Incomplete combustion of larger molecular weight hydrocarbons contributes to particulate emissions. The particulates

from natural gas combustion have been estimated to be less than 1 micrometer in size and have been classified as filterable and condensable fractions. Filterable PM emissions from gas fired equipment are typically low. Increased PM emissions may result from poor air/fuel mixing or maintenance problems.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential particulate emission control technologies for boilers/process heaters were identified:

- Catalytic oxidation – installation of catalyst bed in boiler exhaust to reduce particulate emissions;
- Proper burner design – Proper burner design to achieve good combustion efficiency;
- Use of natural gas only – natural gas is processed to meet specifications such as methane content and heating value which result in more efficient combustion compared to other fuels.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the options identified above: catalytic oxidation, proper burner design and combustion control, and restrictions to only fire pipeline natural gas. For natural gas fired equipment, proper equipment design and combustion control was the most applied BACT for reduction of particulate emissions.

BACT Determinations

The use of only natural gas and proper burner design achieving the following limitations is being proposed as BACT for the Facility:

Operation Mode	Fuel Combusted	$PM/PM_{10}/PM_{2.5}$ Emission Limits for each boiler	Control Technology
All	Natural gas with ethane backup	0.005 lb/MMBtu	Proper burner design, good combustion practices and use of only natural gas with ethane backup
		2.00 lbs/hr	

BACT also includes the establishment of an annual limitation not to exceed 4.38 tons per rolling 12-month period from all three boilers combined.

<u>Natural Gas Fired Boilers - BACT Analysis for GHGs</u>

During the fuel combustion process, CO_2, CH_4, and N_2O emissions are all produced. In a properly tuned boiler, 99.9% of the fuel carbon in natural gas is converted to CO_2 during the combustion process and the conversion does not depend on boiler or combustor type. The 0.1% of fuel carbon that is not converted to CO_2 results in CH_4, CO, and/or VOC emissions and is due to incomplete combustion. However, even in boilers operating with poor combustion efficiency, the amount of CH_4, CO, and/or VOC produced is insignificant compared to CO_2 levels.

Formation of N_2O during the combustion process is affected by two combustion process factors: combustion temperature and excess oxygen level. When the combustion temperature is high (above 1475 °F) and excess oxygen is low (less than 1 percent), minimal N_2O emissions are generated. Otherwise, the formation of N_2O increases.

Methane emissions are also affected by the combustion temperature. Low-temperature combustion will produce high level of methane emissions; In addition, incomplete combustion also increases methane emissions. Incomplete combustion also results in CO emissions being high during the start-up or shut-down cycle of boilers. Typically, conditions that promote formation of N_2O also benefit emissions of methane.

The amount of N_2O and CH_4 produced from a boiler is very low (approximate 0.1%) compared to emissions of CO_2 produced. Since CO_2 emissions account for the majority of the GHG emissions, this BACT analysis is focused on controlling CO_2.

Identification of Control Options

The following resources were reviewed to identify potential technologies to GHG emissions from the cracking furnaces:

- USEPA's RBLC Clearinghouse database;
- USEPA, PSD and Title V Permitting Guidance for Greenhouse Gases, March 2011. Available at http://www.epa.gov/sites/production/files/2015-07/documents/ghgguid.pdf;
- USEPA, "Available and Emerging Technologies for Reducing Greenhous Gas Emissions from the Petroleum Refining Industry", 2010. Available at https://www.epa.gov/sites/production/files/2015-12/documents/refineries.pdf;
- USEPA – "Available and Emerging Technologies for Reducing Greenhous Gas Emissions from Industrial, Commercial, and Institutional Boilers", 2010. Available at https://www.epa.gov/sites/production/files/2015-12/documents/iciboilers.pdf;
- Report of the Interagency Task Force on Carbon Capture and Storage, 2010. Available at http://www3.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf; and
- U.S. Department of Energy, "Improving Steam System Performance: A Sourcebook for Industry", 2nd Edition. Available at http://energy.gov/sites/prod/files/2014/05/f15/steamsourcebook.pdf.

Based on the review of above resources, the potential GHG control technologies identified for cracking furnaces include the following:

- Use of low carbon gaseous fuels to reduce the amount of GHG produced;
- Use of good operating and maintenance practices such as annual boiler tune-ups, monitoring of operations, optimization of instrumentation and process controls, etc. In addition, proper maintenance and operation of boilers systems is important with regards to efficiency and reliability;
- Boiler efficiency improvement measures including combustion air controls, installation of heat recovery equipment, boiler blow down minimization and heat recovery, boiler feed water preparation, insulation, installation of condensate return lines, etc.;
- Carbon Capture and Sequestration. CCS is not considered to be a viable alternative for controlling GHG emissions from natural gas-fired facilities. This statement is supported by the BACT example for a natural gas fired boiler in Appendix F of EPA's PSD and Title V Permitting Guidance for Greenhouse Gases (March 2011). In the EPA example, CCS is not even identified as an available control option for natural gas fired-facilities. However, CCS is being included in this analysis as a feasible technology per page 32 of the guidance. The EPA guidance indicates that:

"For the purposes of a BACT analysis for GHG, EPA classifies CCS as an add-on pollution control technology that is "available" for facilities emitting CO_2 in large amounts, including fossil fuel-fired power plants, and for industrial facilities with high- purity CO_2 streams (e.g., hydrogen production, ammonia production, natural gas processing, ethanol production, ethylene oxide production, cement production, and iron and steel manufacturing). For these types of facilities, CCS should be listed in Step 1 of a top-down BACT analysis for GHGs. This does not necessarily mean CCS should be selected as BACT for such sources. Many other case-specific factors, such as the technical feasibility and cost of CCS technology for the specific application, size of the facility, proposed location of the source, and availability and access to transportation and storage opportunities, should be assessed at later steps of a top-down BACT analysis".

Search of RBLC Determinations

The search of the RBLC and other available permits indicate that BACT is exclusively determined to be good combustion practices and certain boiler efficiency improvement measures.

BACT Determinations

An analysis of CCS indicated that it would neither be technically feasible nor cost-effective and as such CCS was not considered as BACT for GHG emission control. The boilers will employ a burner design to minimize GHG emissions. The proposed BACT for the Facility is a combination of the following:

- Use of low carbon intensity gaseous fuels
    - Natural gas used as supplemental fuel
    - Process tail gas used as fuel to maximize thermal efficiency
- Good combusting and operating practices
    - Sufficient residence time to guarantee efficient operation,
    - Properly controlled excess air and sufficient turbulence to support the optimum combustion condition, combustion control system to optimize the oxygen and air flow to maximize fuel efficiency,
    - Maintenance of all equipment according to manufacturer's recommended Operations and Maintenance Practice
- Efficiency improvement measures to maximize overall unit energy efficiency
    - Burner tune up requirements in accordance with Boiler MACT (40 CFR Part 63, Subpart DDDDD);
    - Feed water economizers and combustion air pre-heaters included in boiler specification and design;
    - Boiler feed water treated to removed dissolved solids to minimize boiler blowdown;
    - Condensate system recovery and return to boiler feed water system after treated for removal of any dissolved solids or other contaminants;
    - Heat recovery from boiler blowdown to pre-heat boiler feed water and use of boiler blowdown steam for low pressure stream needs;
    - Insulation of boilers and piping to reduce heat loss;
    - Reduce of standby losses by proper process design and specification of stable operation for the targeted operating range.

Since all the proposed energy efficiency improvement measures are interdependent and represent an integrated energy efficiency strategy, for compliance demonstration, PTTGCA is proposing a holistic BACT

limit which reflects the combined effects of all the proposed energy efficiency measures. PTTGCA is proposing a CO2e emission limit of 117 lb/MMBtu.

BACT also includes the establishment of an annual limitation not to exceed 102,500 tons CO_2e per rolling,12-month period for the combined three boilers.

Ethylene Manufacturing Unit - BACT Analysis for VOC

The Ethylene Manufacturing Unit is designed to minimize the generation of VOC emissions by recycling waste streams back through the process. Waste streams or process vents where it is not feasible to be recycled back through the process are routed to control devices.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential VOC control technologies for process vents were identified:

- Thermal Oxidation (including recuperative type);
- Regenerative Thermal Oxidation (RTO);
- Flares;
- Catalytic Oxidation Combustion;
- Carbon Adsorption;
- Absorbers;
- Condensers/Refrigeration.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the following options identified above: thermal oxidation (including recuperative type), regenerative thermal oxidation, flares, and catalytic oxidation combustion. The search of the RBLC also revealed that no control of process vents was also established as BACT.

BACT Determinations

The use of a closed vent system controlled with a flare (high pressure) achieving a destruction efficiency of 98% for VOC is being proposed as BACT for the following process vent streams:

- startup/shutdown/maintenance/upsets;
- spent caustic degassing drum;
- spent caustic drain drum; and
- pressure relief valve (PRV) leaks/releases.

The use of a thermal oxidizer achieving a destruction efficiency of 99.5% for VOC is being proposed as BACT for the following process vent streams:

- quench water drain drum;
- wet air oxidation unit;
- dimethyl disulphide (DMDS) tank; and
- wash oil tank.

HDPE & LLDPE/HDPE Manufacturing Units - BACT Analysis for VOC

The HDPE & LLDPE/HDPE Manufacturing Units are designed to minimize the generation of VOC emissions by recycling waste streams back through the process. Waste streams or process vents where it is not feasible to be recycled back through the process are routed to control devices except for process vents downstream of the pellet extruders. The concentration of VOC in the process vents downstream of the pellet extruders are at such low levels it is not viable to recycle or control such streams.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential VOC control technologies for process vents were identified:

- Thermal Oxidation (including recuperative type);
- Regenerative Thermal Oxidation (RTO);
- Flares;
- Catalytic Oxidation Combustion;
- Carbon Adsorption;
- Absorbers; and
- Condensers/Refrigeration.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the following options identified above: thermal oxidation (including recuperative type), regenerative thermal oxidation, flares, and catalytic oxidation combustion. The search of the RBLC also revealed that no control of process vents was also established as BACT.

BACT Determinations

The use of closed vent systems controlled with a flare (high pressure and/or low pressure) achieving a destruction efficiency of 98% for VOC is being proposed as BACT for the following process vent streams:

HDPE Manufacturing Units:

- intermediate flash slurry sampler;
- LSR lights condenser;
- heavies column; and

- pressure relief valve (PRV) leaks/releases.

LLDPE/HDPE Manufacturing Units:

- butene dryer regen vents;
- hexene dryer regen vents;
- ICA dryer regen vents
- ethylene deoxo regen vents
- ethylene dryers regen vents;
- non-emergency reactor vents;
- product purge bin vent filters; and
- pressure safety valve (PSV) leaks/releases.

The use of a thermal oxidizer achieving a destruction efficiency of 99.5% for VOC is being proposed as BACT for the following process vent streams:

- LPSR condensate separators;
- powder conveying package vent;
- analyzer vents;
- degassing column vents;
- ethylene purification;
- low product purge bin vent filter; and
- high pressure accumulator vent.

To address the low level VOC concentration is vent streams downstream of the pellet extruder a residual VOC concentration of less than 80 ppmv in polyethylene resin exiting the extruder is being proposed as BACT. BACT also included the establishment of an annual limitation not to exceed 28.00 tons VOC per rolling,12-month period for uncontrolled vent emissions from each individual HDPE manufacturing unit.

HDPE and LLDPE/HDPE Manufacturing Units - BACT Analysis for PM, PM_{10}, $PM_{2.5}$

During the HDPE and LLDPE/HDPE manufacturing process, emissions of particulate matter are generated from the processing, handling, and storage of HDPE resin pellets. The emissions of particulate matter are filterable in nature resulting in the same control technologies applying to all forms of particulate matter (PM, PM_{10}, and $PM_{2.5}$). Due to the application of the same control technologies for filterable particulate matter, throughout this BACT analysis, all forms of PM are referred to as “PM”.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential PM control technologies for process vents were identified:

- Electrostatic precipitator;
- Baghouses/Filters; and
- Scrubbers.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the options identified above: electrostatic precipitation, fabric filtration, and scrubbers. The search of the RBLC also revealed that no control of process vents was also established as BACT.

BACT Determinations

The use of fabric filtration achieving the following maximum outlet concentrations and emission limitations for identified process vents is being proposed as BACT:

- use of fabric filtration control for achieving a maximum outlet concentration of 0.005 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations* for $PM_{10}/PM_{2.5}$ for the following process vents:

HPDE Manufacturing Units		
Process Vents	$PM_{10}/PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
catalyst activator jacket vents	0.10	0.44
catalyst filter vents	0.0015	0.006
extruder vent filters	0.015	0.065
additive vent filters	0.04	0.175
additive feeder vents	0.001	0.0044

LLDPE/HPDE Manufacturing Units		
Process Vents	$PM_{10}/PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
catalyst vent filters	0.24	0.12
receiver bin filter vents & seed bed filter vents	0.08	0.35

- use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations* for $PM_{10}/PM_{2.5}$ for the following process vents:

HPDE Manufacturing Units		
Process Vents	$PM_{10}/PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
pellet conveying hopper vents	0.004	0.0175
pellet hopper vent	0.06	0.263
pellet & off-spec blender/silo vents	0.088	0.386

LLDPE/HPDE Manufacturing Units		
Process Vents	$PM_{10}/PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
granular resin surge hopper/vent filters	0.042	0.184
bag dump stations/dump hopper vent filters	0.0515	0.226
talc surge bin filters	0.012	0.053
mixer vent filters	0.009	0.039
pellet conveying hopper vents	0.004	0.018
pellet hopper vents	0.06	0.26
pellet blending/off-spec blending silos	0.114	0.500

- A maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitation* for $PM_{10}/PM_{2.5}$ for the pellet dryer vents:

Process Vents	$PM_{10}/PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
HDPE pellet dryer vents	0.134	0.587
LLDPE/HDPE pellet dryer vents	0.05	0.11

- Visible particulate emissions from each process vent stack controlled with fabric filtration shall not exceed 5% opacity.
- Visible particulate emissions from each pellet dryer vent shall not exceed 5% opacity.

HDPE Manufacturing Units - BACT for Catalyst Activation Section

The two HDPE Manufacturing Units share a common catalyst activation system which involves two identical catalyst activator furnaces which burn tail gas and natural gas in furnace heating jackets. The furnaces have a maximum heat input capacity of 10.4 MMBtu/hr each and produce emissions associated with the products of combustion: NO_x, CO, PM/PM_{10}/$PM_{2.5}$, VOC, and GHGs. The evaluation of BACT for the catalyst activation furnaces is identical to BACT evaluation presented for "Natural Gas Fired Boilers". Proper burner design achieving the following limitations for combustion emissions associated with the catalyst activation furnaces (heating jackets) is being proposed as BACT:

BACT Pollutant	Emission Limits
NO_x	0.098 lb/MMBtu
	0.51 lb/hr for each furnace
	4.47 tons per rolling, 12-month period for the two activator furnaces combined
CO	0.082 lb/MMBtu
	0.43 lb/hr for each furnace
	3.74 tons per rolling, 12-month period for the two activator furnaces combined
VOC	0.0054 lb/MMBtu
	0.03 lb/hr for each furnace
	0.25 ton per rolling, 12-month period for the two activator furnaces combined
$PM_{10}/PM_{2.5}$*	0.0075 lb/MMBtu
	0.04 lb/hr for each furnace
	0.34 ton per rolling, 12-month period for the two activator furnaces combined
	Visible particulate emissions from each individual furnace stack shall not exceed five percent opacity
CO_2e	117 lbs/MMBtu
	5,335 tons per rolling, 12-month period for the two activator furnaces combined

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for BACT purposes.

The catalyst activation system also involves co-catalyst container changes which only result in emissions of criteria or regulated pollutants due to control by passing vent streams through a seal pot containing mineral oil resulting only in emissions of nitrogen gas used in co-catalyst transfer. The above control is being proposed

as BACT along with a visible limitation that there shall be no visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit.

Thermal Oxidizers - BACT for NOx, CO, VOC, PM/PM_{10}/$PM_{2.5}$, and GHG

A thermal oxidizer (TO) is used as a control device to reduce VOC and hazardous air pollutant (HAP) emissions from waste gas and process vent streams. The incineration process of the TO will result in NO_x, CO, and emissions of PM/PM_{10}/$PM_{2.5}$ due to the combustion of waste gases and pilot gas. Small amounts of VOC will be released due to the incomplete destruction of the waste gas streams.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential control technologies were identified for the TO. The identified control technologies address BACT for all pollutants; NOx, CO, VOC, PM/PM_{10}/$PM_{2.5}$, and GHG:

- Good process design minimizing the amount of waste gas vented to TO;
- TO design to achieve high destruction efficiency;
- Best operational practices; and
- Use of pipeline natural gas as pilot gas.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the following options identified above: good process design minimizing waste gas, high destruction efficiency design, best operational practices, and use of pipeline natural gas for TO pilots.

BACT Determinations

A TO design achieving a 99.5% destruction efficiency for VOC (which exceeds both NSPS and NESHAP requirements) and use of natural gas as pilot light fuel is being proposed as BACT for the TOs. BACT also includes the establishment of the following emissions limitations:

BACT Pollutant	Emission Limits
NO_x	0.61 lb/hr
	2.67 tons per rolling, 12-month period
CO	0.51 lb/hr
	2.22 tons per rolling, 12-month period
VOC	0.03 lb/hr
	0.14 tons per rolling, 12-month period

$PM_{10}/PM_{2.5}$*	0.05 lb/hr
	0.20 ton per rolling, 12-month period
	Visible particulate emissions from the TO stack shall not exceed five percent opacity
CO_2e	3,161 tons per rolling, 12-month period

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for BACT purposes.

Flares - BACT for NOx, CO, VOC, $PM/PM_{10}/PM_{2.5}$, and GHG

Flares are used as a control device to reduce VOC and hazardous air pollutant (HAP) emissions from waste gas and process vent streams. The combustion process of the flares will result in NO_x, CO, and emissions of $PM/PM_{10}/PM_{2.5}$ due to the combustion of waste gases and pilot gas. Small amounts of VOC will be released due to the incomplete destruction of the waste gas streams.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential control technologies were identified for the flares. The identified control technologies address BACT for all pollutants; NOx, CO, VOC, $PM/PM_{10}/PM_{2.5}$, and GHG:

- Good process design minimizing the amount of waste gas vented to the flares;
- Flare design achieving destruction efficiency compliant with NSPS and NESHAP requirements;
- Best operational practices; and
- Use of pipeline natural gas as pilot gas.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the following options identified above: flare minimization, destruction efficiency design, best operational practices, and use of pipeline natural gas for flare pilot flame.

BACT Determinations

Flare design achieving a 98% destruction efficiency for VOC (which complies with both NSPS and NESHAP requirements) and use of natural gas as pilot light fuel is being proposed as BACT for the flares.

BACT also includes the establishment of the following emissions limitations for normal operation of the high pressure (HP) and low pressure (LP), ground flares utilized at the Facility:

BACT Pollutant	Emission Limits	
	HP Flare	LP Flare
NO_x	0.54 ton per rolling, 12-month period	0.23 ton per rolling, 12-month period
CO	2.92 tons per rolling, 12-month period	1.26 tons per rolling, 12-month period
VOC	4.49 tons per rolling, 12-month period	1.97 tons per rolling, 12-month period
$PM_{10}/PM_{2.5}$*	0.06 ton per rolling, 12-month period	0.03 ton per rolling, 12-month period
	No visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours	
CO_2e	923 tons per rolling, 12-month period	400 tons per rolling, 12-month period

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for BACT purposes.

Flare gas recovery is not technically feasible for this project due to the small amount of gas directed to the flares during normal operation.

Equipment and Process Leaks (Facility-Wide) - BACT for VOC

Process operations at the Facility involve a large number of process piping components such as valves, flanges, connectors, pumps, compressors, etc. Leakage from piping components is a potential source of fugitive emissions involving VOC and/or methane.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and regulations applicable to equipment leaks the following control options were identified:

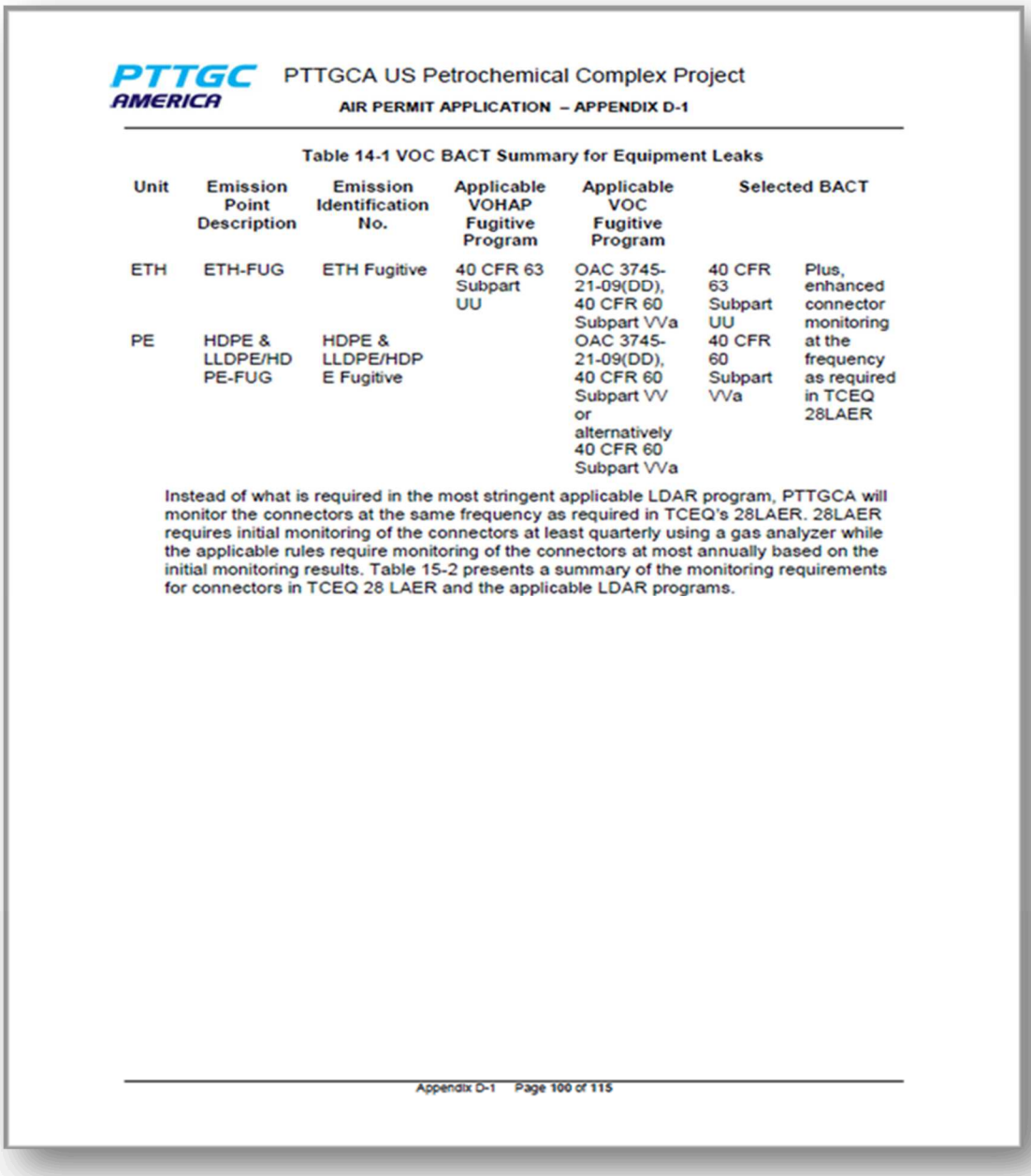
- Use of leakless technologies;
- Implementation of Leak Detection and Repair (LDAR) programs using instrumentation;
- Implementation of LDAR programs using alternative monitoring (i.e. remote sensing technology);
- Implementation of LDAR programs using routine inspections and audio/visual/olfactory detection.

Search of RBLC Determinations

The search of the RBLC revealed the primary control to be the implementation of effective LDAR programs.

BACT Determinations

The implementation of applicable LDAR regulations with enhanced connector monitoring is being proposed as BACT. The following table from the permit application outlines applicable LDAR regulations:



PTTGC AMERICA PTTGCA US Petrochemical Complex Project

AIR PERMIT APPLICATION – APPENDIX D-1

Table 14-1 VOC BACT Summary for Equipment Leaks

Unit	Emission Point Description	Emission Identification No.	Applicable VOHAP Fugitive Program	Applicable VOC Fugitive Program	Selected BACT	
ETH	ETH-FUG	ETH Fugitive	40 CFR 63 Subpart UU	OAC 3745-21-09(DD), 40 CFR 60 Subpart VVa	40 CFR 63 Subpart UU	Plus, enhanced connector monitoring at the frequency as required in TCEQ 28LAER
PE	HDPE & LLDPE/HDPE-FUG	HDPE & LLDPE/HDPE Fugitive		OAC 3745-21-09(DD), 40 CFR 60 Subpart VV or alternatively 40 CFR 60 Subpart VVa	40 CFR 60 Subpart VVa	

Instead of what is required in the most stringent applicable LDAR program, PTTGCA will monitor the connectors at the same frequency as required in TCEQ's 28LAER. 28LAER requires initial monitoring of the connectors at least quarterly using a gas analyzer while the applicable rules require monitoring of the connectors at most annually based on the initial monitoring results. Table 15-2 presents a summary of the monitoring requirements for connectors in TCEQ 28 LAER and the applicable LDAR programs.

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Enhanced connector monitoring will involve the same frequency applied in the Texas Commission of Environmental Quality (TCEQ) 28LAER program which requires initial monitoring of connectors at least quarterly using a gas analyzer.

BACT also includes the establishment of an emission limitation not to exceed 99.38 tons VOC per rolling, 12-month period.

Equipment and Process Leaks (Facility-Wide) - BACT for GHG

GHGs are emitted from fugitive equipment and process leaks in the form of methane released with the leaks of VOC as outlined in the previous section. Leaks of methane can also occur in piping components used to deliver natural gas to combustion sources such as the cracking furnaces, boilers, flares, etc. The amount of methane from equipment leaks is negligible compared to GHGs generated by combustion sources.

Identification of Control Options

Identification of control options for equipment leaks involving GHGs is identical to those presented for fugitive leaks of VOC presented in the previous section.

Search of RBLC Determinations

The search of the RBLC revealed the primary control to be the implementation of effective LDAR programs.

BACT Determinations

The implementation of an LDAR program involving audio/visual/olfactory monitoring for piping components in tail gas and natural gas services is being proposed as BACT. BACT also includes the establishment of an emission limitation of 36 tons CO_2e.

Wastewater Treatment Plant - BACT for VOC

The WWTP will control the wastewater streams generated from the ethylene manufacturing unit, the HDPE units, the LLDPE/HDPE units, and the sanitary wastewater from the buildings. During the wastewater collection, transport, and treatment process, VOCs will be released to the atmosphere when the VOC-containing wastewater is in contact with ambient air. The wastewater treatment plant to be constructed consists of an oily water treatment plant, a process biological treatment plant and a sanitary treatment plant. Waste streams containing oil as the primary contaminant will be sent to the oily water treatment system while those which have high levels of organics will be routed to the process biological wastewater treatment system. Sanitary waste collected from buildings will be sent to the sanitary treatment plant for treatment.

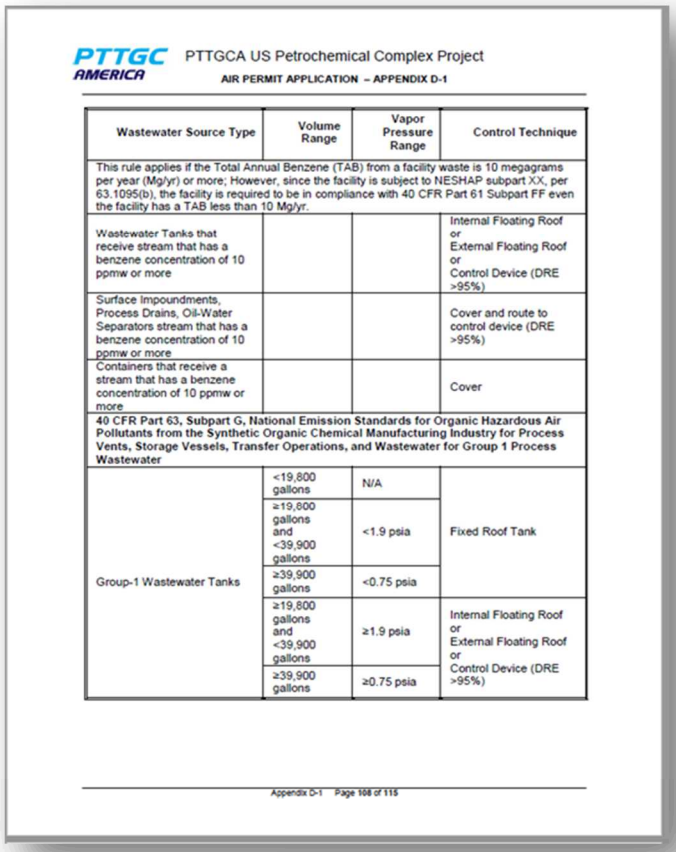
Identification of Control Options

Based on a review of the RBLC, other permit review results, and regulations applicable to wastewater treatment, the following control options were identified:

- Internal or external floating roof storage tanks;
- Route emissions to control device through a closed system;
- Completely cover and seal all wastewater treatment equipment that has the potential for VOC emissions; and
- No control and/or good housekeeping practices.

Search of RBLC Determinations

The search of the RBLC revealed previous BACT determinations for wastewater treatment to be compliance with the most stringent applicable regulation. The following tables from the permit application outline applicable regulations to wastewater treatment operations and the associated requirements:



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AIR PERMIT APPLICATION – APPENDIX D-1

Wastewater Source Type	Volume Range	Vapor Pressure Range	Control Technique
This rule applies if the Total Annual Benzene (TAB) from a facility waste is 10 megagrams per year (Mg/yr) or more; However, since the facility is subject to NESHAP subpart XX, per 63.1095(b), the facility is required to be in compliance with 40 CFR Part 61 Subpart FF even the facility has a TAB less than 10 Mg/yr.			
Wastewater Tanks that receive stream that has a benzene concentration of 10 ppmw or more			Internal Floating Roof or External Floating Roof or Control Device (DRE >95%)
Surface Impoundments, Process Drains, Oil-Water Separators stream that has a benzene concentration of 10 ppmw or more			Cover and route to control device (DRE >95%)
Containers that receive a stream that has a benzene concentration of 10 ppmw or more			Cover
40 CFR Part 63, Subpart G, National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater for Group 1 Process Wastewater			
Group-1 Wastewater Tanks	<19,800 gallons	N/A	Fixed Roof Tank
	≥19,800 gallons and <39,900 gallons	<1.9 psia	
	≥39,900 gallons	<0.75 psia	
	≥19,800 gallons and <39,900 gallons	≥1.9 psia	Internal Floating Roof or External Floating Roof or Control Device (DRE >95%)
	≥39,900 gallons	≥0.75 psia	

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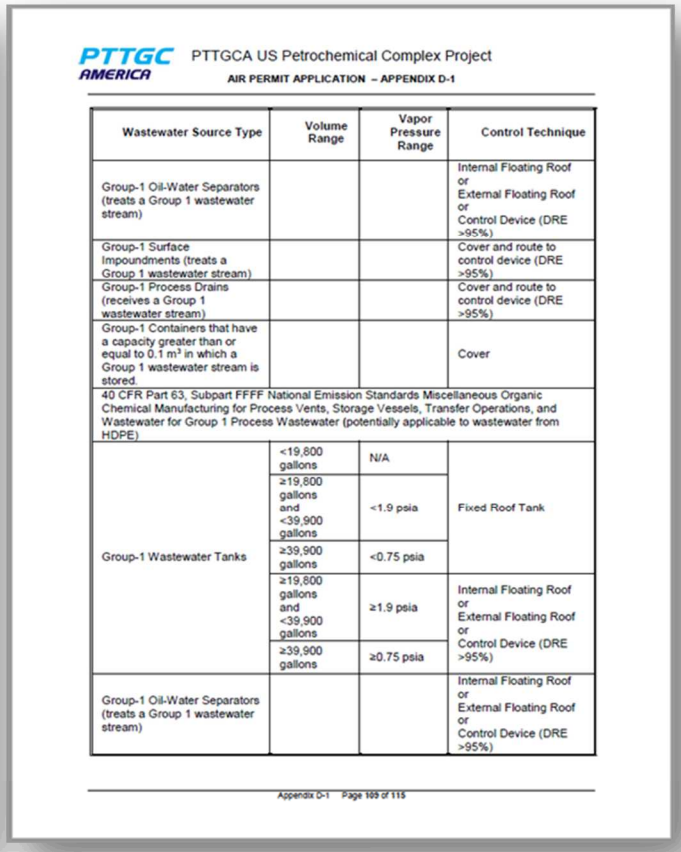

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AIR PERMIT APPLICATION – APPENDIX D-1

Wastewater Source Type	Volume Range	Vapor Pressure Range	Control Technique
Group-1 Oil-Water Separators (treats a Group 1 wastewater stream)			Internal Floating Roof or External Floating Roof or Control Device (DRE >95%)
Group-1 Surface Impoundments (treats a Group 1 wastewater stream)			Cover and route to control device (DRE >95%)
Group-1 Process Drains (receives a Group 1 wastewater stream)			Cover and route to control device (DRE >95%)
Group-1 Containers that have a capacity greater than or equal to 0.1 m^3 in which a Group 1 wastewater stream is stored.			Cover
40 CFR Part 63, Subpart FFFF National Emission Standards Miscellaneous Organic Chemical Manufacturing for Process Vents, Storage Vessels, Transfer Operations, and Wastewater for Group 1 Process Wastewater (potentially applicable to wastewater from HDPE)			
Group-1 Wastewater Tanks	<19,800 gallons	N/A	Fixed Roof Tank
	≥19,800 gallons and <39,900 gallons	<1.9 psia	
	≥39,900 gallons	<0.75 psia	
	≥19,800 gallons and <39,900 gallons	≥1.9 psia	Internal Floating Roof or External Floating Roof or Control Device (DRE >95%)
	≥39,900 gallons	≥0.75 psia	
Group-1 Oil-Water Separators (treats a Group 1 wastewater stream)			Internal Floating Roof or External Floating Roof or Control Device (DRE >95%)

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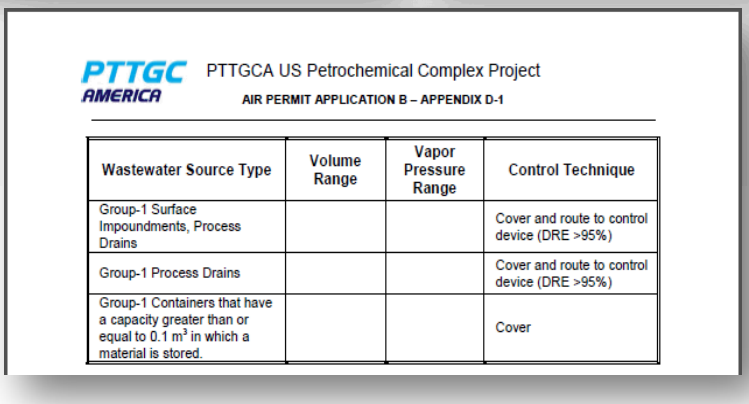

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AIR PERMIT APPLICATION B – APPENDIX D-1

Wastewater Source Type	Volume Range	Vapor Pressure Range	Control Technique
Group-1 Surface Impoundments, Process Drains			Cover and route to control device (DRE >95%)
Group-1 Process Drains			Cover and route to control device (DRE >95%)
Group-1 Containers that have a capacity greater than or equal to 0.1 m^3 in which a material is stored.			Cover

BACT Determinations

The most stringent applicable regulatory requirement for wastewater treatment operations is being proposed as BACT. The following presents BACT requirements for WWTP operations:

- Use an enhanced biodegradation unit to maintain the annual benzene quantity from facility waste at less than 10 megagrams (MG; 11 tons) by combining waste streams with greater than 10 ppmw benzene with waste streams with less than 10 ppmw benzene to form a combined waste stream with a benzene concentration less than 10 ppmw;

- Route emissions from wastewater generated in the ethylene manufacturing process to a thermal oxidizer designed to achieve ≥99.5% destruction efficiency for volatile organic compounds (VOC);

- Cover and route emissions from the process wastewater equalization tank (T-6503), the waste oil drum (T-6502), the oily wastewater storage tank (T-6501) and the wet air oxidation unit to a thermal oxidizer designed to achieve ≥99.5% destruction efficiency for VOC;

- Emissions from wastewater generated in the high-density polyethylene units must comply with the applicable requirements of 40 CFR Part 63, Subpart FFFF; and

- Emissions from the 98% sulfuric acid storage tank (T-3502) and the 12% $NaClO_2$ storage tank (T-5205) shall be vented directly to the atmosphere at a safe location.

Liquid Loading Operations- BACT for VOC

The facility will utilize a 2-arm loading rack to load out light and heavy pygas to railcars. VOC emissions are generated by organic vapors being expelled from the railcar being loaded. Organic vapors are created by the vaporization of residual material left in the railcars from previous loads and the vapors generated as pygas is loaded.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential VOC control technologies for process vents were identified:

- Vapor balance;

- Closed vent system routed to TO/Flare;

- Closed vent system routed to carbon adsorber;

- Closed vent system routed to absorbers/wet scrubbers; and

- Submerged fill.

Search of RBLC Determinations

The search of the RBLC revealed previous BACT determinations for liquid loading operations to be compliance with the most stringent applicable regulation.

BACT Determinations

The most stringent applicable regulatory requirement for liquid loading operations is being proposed as BACT. The following presents BACT requirements for liquid loading operations:

Material	Loading Operation	BACT Control	Applicable Regulation for BACT Basis
Heavy pygas	Railcar	VOC reduction ≥99.5% with TO	BACT
Light pygas	Railcar		

HDPE and LLDPE Railcar Loading Operations - BACT for PM/PM_{10}/$PM_{2.5}$

The loading of HDPE and LLDPE resin pellets into railcars for transport offsite generates emissions of particulate matter. The emissions of particulate matter are filterable in nature resulting in the same control technologies applying to all forms of particulate matter (PM, PM_{10}, and $PM_{2.5}$). Due to the application of the same control technologies for filterable particulate matter, throughout this BACT analysis, all forms of PM are referred to as "PM".

Identification of Control Options

Based on a review of the RBLC, other permit review results, and relevant technical literature, the following potential PM control technologies for process vents were identified:

- Electrostatic precipitator;
- Baghouses/Filters; and
- Scrubbers.

Search of RBLC Determinations

The search of the RBLC revealed the application of control technologies consistent with the options identified above: electrostatic precipitation, fabric filtration, and scrubbers. The search of the RBLC also revealed that no control of process vents was also established as BACT.

BACT Determinations

The use of fabric filtration (baghouse) and the following limitations for emissions of PM_{10}/$PM_{2.5}$ are being proposed as BACT:

- Use of fabric filtration achieving a maximum outlet concentration of 0.002 gr/dscf for PM_{10}/$PM_{2.5}$ and the lb/hr and rolling 12-month limitations for PM_{10}/$PM_{2.5}$ for the following HDPE and LLDPE/HDPE railcar process loading vents:

HPDE Railcar Loading		
Process Loading Vents	PM_{10}/$PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
PE Railcar Loading Bins	0.08	0.15
PE Railcar Loading	0.001	0.002

LLDPE/HPDE Railcar Loading		
Process Loading Vents	PM_{10}/$PM_{2.5}$ Emission Limitations	
		ton per rolling

	lb/hr	12-month period
PE Railcar Loading Bins	0.12	0.19
PE Railcar Loading	0.002	0.003

- A maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitation* for $PM_{10}/PM_{2.5}$ for the PE pellet elutricator & cyclone separator vents:

PE Pellet Elutricator & Cyclone Separators Vents	$PM_{10}/PM_{2.5}$ Emission Limitations	
	lb/hr	ton per rolling 12-month period
HDPE Unit Loading	0.08	0.15
LLDPE/HDPE Unit Loading	0.12	0.19

- use of fabric filtration control for achieving a maximum outlet concentration of 0.001 gr/dscf for PM_{10}, 0.0005 gr/dscf for $PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for PM_{10} and $PM_{2.5}$) for the pellet cleaning package vent that serves both HDPE and LLDPE/HDPE units:
    - for PM_{10}: 0.009 lb/hr and 0.038 ton per rolling 12-month period.
    - for $PM_{2.5}$: 0.004 lb/hr and 0.019 ton per rolling 12-month period
- Visible particulate emissions from each process vent stack controlled with fabric filtration shall not exceed 5% opacity.

Facility Roadways and Parking Areas - BACT for $PM/PM_{10}/PM_{2.5}$

The Facility will construct in-plant roads for truck delivery of raw materials and products and coproducts. PTTGCA will pave all in-plant haul roads; therefore, only mitigation control measures applicable to paved roads are addressed in the BACT analysis. Particulate emissions are generated by the deposit of material on the road surface from spillage, etc. which becomes re-suspended by vehicular traffic.

Identification of Control Options

Based on a review of the RBLC and other permit review results, the following potential control technologies for minimizing dust from vehicular traffic on plant roadways were identified:

- Posting and limiting vehicle speeds;
- Water spray/road washing;
- Chemical stabilization;
- Sweeping; and
- Combination of controls identified above.

Search of RBLC Determinations

The search of the RBLC revealed BACT determinations involving all of the identified control technologies above except for chemical stabilization.

BACT Determinations

Paving of all in-plant haul roads and the implementation of best management practices including posting and limiting vehicle speeds to 20 miles per hour and water spraying or sweeping as necessary on a daily basis. BACT also includes the establishment of the following emission limitations:

- Fugitive particulate emissions (PE) shall not exceed 1.88 tons per rolling, 12-month period.
- Fugitive emissions of particulate matter less than 10 microns (PM10) shall not exceed 0.38 ton per rolling, 12-month period.
- Fugitive emissions of particulate matter less than 2.5 microns (PM2.5) shall not exceed 0.09 ton per rolling, 12-month period.
- No visible PE from any paved roadway or parking area except for a period of time not to exceed one minute during any 60-minute observation period.

Emergency Engines - for NOx, CO, VOC, PM/PM_{10}/$PM_{2.5}$, and GHG

The Facility will utilize 6 diesel fired internal combustion engines to power generators and firewater pumps during emergency situations such as power outages. All the emergency engines will be limited to 100 hours of operation for testing and maintenance. The diesel fired engines emit NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, and GHGs from the combustion of diesel fuel.

Identification of Control Options

Based on a review of the RBLC, other permit review results, and technical literature the following table presents potential control technologies for diesel fired internal combustion engines were identified:

BACT Pollutant	Control Technology
NO_x	Selective Catalytic Reduction (SCR)
	Selective Non-Catalytic Reduction (SNCR)
	Ignition Timing Retard
CO	Catalytic/Thermal Oxidation
VOC	Regenerative Thermal Oxidizer
	Recuperative Thermal Oxidizer
	Catalytic Oxidation

$PM/PM_{10}/PM_{2.5}$	Catalyzed Diesel Particulate Filter (CDPF)
CO_2e	Carbon Capture and Sequestration (CCS)

A limitation on hours of operation in non-emergency situations and combustion design controls (air-to-fuel ratio control, pre-mixed diesel combustion, etc.) were identified as potential control technologies for all pollutants.

Search of RBLC Determinations

The search of the RBLC revealed the following BACT determinations:

- BACT for NOx for most engines was consistent with the applicable standards for specific engine sizes as contained in 40 CFR Part 60, Subpart IIII. The RBLC did contain a lower emission rate associated with a transient Tier IV standard in 40 CFR 1039.102 for non-road engines in specific model years which would not apply for this BACT determination.

- BACT for CO was predominantly an emission rate of 2.6 g/hp-hr consistent with Tier II, Tier III, and Tier IV rated non-road engines in 40 CFR 89.112 and 1039.101.

- BACT for VOC was predominantly emission standards for non-road engines based on model year and size as contained in 40 CFR 1039.101 or 1039.102. VOC is addressed as non-methane hydrocarbon (NMHC) in engine emission standards.

- BACT for $PM/PM_{10}/PM_{2.5}$ was almost exclusively an emission rate of 0.15 g/hp-hr for all BACT determinations. The RBLC did contain a lower emission rate associated with a transient Tier IV standard for non-road engines in specific model years which would not apply for this BACT determination.

- BACT for GHG revealed an emission factor of 1.15 lb/hp-hr to be the lowest and most predominant BACT determination.

BACT Determinations

BACT for NOx, CO, $PM/PM_{10}/PM_{2.5}$, and VOC is being proposed as the installation of diesel-fire engines certified to meet the following standards in Table 4 of 40 CFR Part 60, Subpart IIII:

BACT Pollutant	402 HP Firewater Pump Engines	1,341 HP Emergency Generator Engines	3,353 HP Emergency Generator Engine
NMHC + NO_x	3.0 g/hp-hr (4.0 g/kW-hr)	4.8 g/hp-hr (6.4 g/kW-hr)	4.8 g/hp-hr (6.4 g/kW-hr)
	2.64 lbs/hr	14.96 lbs/hr	37.41 lbs/hr
	0.13 ton/rolling 12-months	0.75 ton/rolling 12-months	1.87 tond/rolling 12-months
CO	2.6 g/hp-hr (3.5 g/kW-hr)	2.6 g/hp-hr (3.5 g/kW-hr)	2.6 g/hp-hr (3.5 g/kW-hr)
	2.31 lbs/hr	7.70 lbs/hr	19.25 lbs/hr
	0.12 ton/rolling 12-months	0.39 ton/rolling 12-months	0.96 ton/rolling 12-months
	0.15 g/hp-hr	0.15 g/hp-hr	0.15 g/hp-hr

PM PM_{10} $PM_{2.5}$	(0.20 g/kW-hr) 0.13 lb/hr 0.0066 ton/rolling 12-months	(0.20 g/kW-hr) 0.44 lb/hr 0.022 ton/rolling 12-months	(0.20 g/kW-hr) 1.10 lbs/hr 0.055 ton/rolling 12-months
CO_2e	23.0 tons/rolling 12-months	80.0 tons/rolling 12-months	200.0 tons/rolling 12-months

BACT also involves that good operating practices (proper maintenance and operation) shall be implemented and the engines shall not operate more than 100 hours per year for non-emergency use.

Cooling Towers - BACT for PM/PM_{10}/$PM_{2.5}$

The Facility will utilize an evaporative cooling tower which will provide a large surface area for contact between water droplets and forced cooling air. The forced air flow carries aerosol droplets of "drift" out of the top of the cooling tower. Dissolved solids within the aerosol droplets can result in emissions of particulate matter when the water evaporates. The emissions of particulate matter are filterable in nature resulting in the same control technologies applying to all forms of particulate matter (PM, PM_{10}, and $PM_{2.5}$). Due to the application of the same control technologies for filterable particulate matter, throughout this BACT analysis, all forms of PM are referred to as "PM".

Identification of Control Options

Based on a review of the RBLC, other permit review results, and technical literature the following control technologies for emissions of PM from cooling tower operations were identified:

Mist/Drift Eliminators – reduces the amount of aerosol water droplets from cooling tower;

Limitation on dissolved solids in cooling water – reduces the amount of dissolved solids that can form into PM;

Dry Cooling Towers – air cooled heat exchanger eliminates the use of water for evaporative cooling;

Indirect Contact Tower Exchanger – use of a sealed bank of exchanger tubes bathed in a circulating water cascade to cool process water.

Search of RBLC Determinations

The search of the RBLC revealed essentially all approved BACT determinations involved drift eliminators achieving drift rates from 0.0005% to 0.01%. A number of the BACT determinations requiring drift eliminators also included limits on the total dissolved solids (TDS) content in the recirculating cooling water.

BACT Determinations

The use of high efficiency drift eliminators achieving a drift rate of 0.0005% and the maintenance of a TDS concentration in the recirculating cooling water not to exceed 2,000 ppm is being proposed as BACT. BACT also includes the following annual limitations on particulate emissions:

- 5.07 tons PE per rolling 12-month period;
- 3.22 tons PM10 per rolling 12-month period; and
- 0.01 ton PM2.5 per rolling 12-month period.

Cooling Towers - BACT for VOC

Heat exchangers which use cooling tower water for cooling of stream which contain VOC can develop leaks resulting in VOC within the cooling tower water. VOC contained in the cooling tower water can be stripped out and emitted during the evaporative cooling process.

Identification of Control Options & Search of RBLC Determinations

The only identified control technology to reduce wet cooling tower VOC emissions is a Leak Detection and Repair (LDAR) program for heat exchangers.

BACT Determinations

The cooling tower is subject to NESHAP regulations which require leak monitoring and repair for heat exchanger within chemical manufacturing processes. Compliance with the applicable heat exchanger requirements in 40 CFR Part 63, Subpart XX and 40 CFR Part 63, Subpart F are being proposed as BACT. A VOC concentration not to exceed 0.7 lb/MMgal and annual limitation of 42.55 tons VOC per rolling 12-month period are also being proposed as BACT.

Modeling Review

PTTGC America LLC (PTTGCA) contracted with Trinity Consultants to conduct air dispersion modeling for carbon monoxide (CO), nitrogen oxides (NOx), particulate matter with a diameter equal to or less than 10 microns (PM_{10}), particulate matter with a diameter equal to or less than 2.5 microns ($PM_{2.5}$), and ammonia (NH_3). This portion of the document represents the conclusions of the review of the air dispersion modeling submittal accompanying the application.

Potential emissions from the proposed project in tons per year (TPY) are:

CO: 544 TPY

NOx: 164 TPY

PM_{10}: 89 TPY

$PM_{2.5}$: 86 TPY

SO_2: 23 TPY

VOC: 396 TPY

Based on these potential emissions from the proposed facility, the project triggers Federal Prevention of Significant Deterioration (PSD) review requirements for emissions of CO, NOx, PM_{10}, $PM_{2.5}$, and VOC. The proposed facility will also emit the air toxic ammonia in amounts exceeding the Ohio EPA modeling threshold of one ton per year. Toxics modeling, and an analysis of the project's impacts on soils, vegetation and visibility, have been included. Modeling is not required for greenhouse gases, and quantitative analyses have been included to account for chemical transformation of NOx and VOC to ozone as well as the secondary formation of $PM_{2.5}$ from chemical precursors.

Trinity Consultants used the AERMOD (version 18081) dispersion model to show compliance with all relevant PSD increments, National Ambient Air Quality Standards (NAAQS), and Ohio Acceptable Incremental Impacts (OAII). Trinity Consultants also submitted quantitative analyses of secondary $PM_{2.5}$ and ozone formation potential to show compliance with $PM_{2.5}$ and ozone NAAQS and PSD Increments consistent with recent USEPA guidance. For air toxics modeling, Trinity Consultants used AERMOD to show compliance in accordance with the Ohio EPA's Maximum Allowable Ground Level Concentration (MAGLC).

Modeling Information

This project is proposed to be located in Belmont County, OH. The coordinates of the of the proposed facility, represented in the Universal Transverse Mercator (UTM) coordinate system, are approximately 519,389 m East, 4,418,467 m North in UTM Zone 17 (NAD83).

All modeled concentrations were calculated in micrograms per cubic meter ($\mu g/m^3$). No deposition or depletion were modeled for any pollutant or averaging period. The latest version of AERMOD was used in all modeling analyses. Complex terrain and building downwash parameters were considered in the modeling.

Five years of meteorological data have been used in accordance with Ohio Engineering Guide #69: Guideline on Air Quality Models. Trinity Consultants used five years (2013-2017) of surface meteorological data collected at the Buckeye Power Cardinal Plant monitoring network and five years of upper air data from the Pittsburgh International Airport in the model. Missing surface data were substituted with data collected at the National Weather Service meteorological station located at the Wheeling/Ohio County Airport (KHLG, WBAN# 14894). The use of meteorological data from the Cardinal met station was approved for use by Ohio EPA based on several studies demonstrating that this met data is more representative of meteorological conditions within the Ohio River Valley.

RESULTS

Class I

The proposed facility is located within 300 kilometers of 4 Class I areas. The Q/D screening procedure described in Federal Land Managers' Air Quality Related Work Group guidance (FLAG 2010) was performed. The Q/D values obtained were significantly less than 10, and therefore it was determined that a Class I AQRV analysis was not needed for the proposed facility.

Class II

PSD Significant Impact Level (SIL)

Ohio EPA analyzed the significant impact of criteria pollutants (NO_2, CO, PM_{10} and $PM_{2.5}$), and compared the modeled concentrations with the appropriate SIL resulting from modeled potential emissions. SILs were exceeded for 24-hour PM_{10}, and all applicable averaging periods for $PM_{2.5}$ and NO_2. Therefore, with the exception of CO and annual PM_{10}, a full interactive modeling analysis was necessary, inclusive of NAAQS, PSD Increment, and OAII standards.

PSD Increment and OAII

The results of PSD Increment and OAII interactive modeling are shown in Table 6.3 of the *PSD Air Quality Analysis Modeling Report PTTGC America, LLC > Dilles Bottom* document. It is Ohio EPA practice that any new source will not consume more than one-half of the available PSD increment. Exceptions to this policy are granted on a case-by-case basis when modeled results are more than 50% but less than 83% of the increment. The results of the increment modeling are replicated here as Table 1:

Table 1: PSD Increment and OAII model results.

Pollutant/Averaging Period	Modeled Results ($\mu g/m^3$)	PSD Increment ($\mu g/m^3$)	OAII ($\mu g/m^3$)	Exceeds OAII?
PM10 24-hr	7.5	30	15	NO
PM2.5 24-hr	8.5	9	4.5	YES

PM2.5 Annual	1.01	4	2	NO
NO2 Annual	1.7	25	12.5	NO

It should be noted that the OAII was exceeded for 24-hr $PM_{2.5}$. Ohio EPA determined, based on the limited aerial extent of values exceeding the OAII, the likelihood of future additional PSD projects in this area, and that the exceedances were not above any health-based standards, that an exemption of the OAII was warranted in this case. All other pollutants were below OAII values. No PSD increment was exceeded for any pollutant or averaging period.

National Ambient Air Quality Standards

For those pollutants and averaging periods for which initial SIL screen modeling demonstrated modeled concentrations above the SIL, it must be demonstrated that the proposed project will not cause an exceedance of the NAAQS, inclusive of interactive sources and conservative background concentrations. The results of the NAAQS modeling analysis are shown in Table 2, below. These results are also reported in Table 6.2 of the *PSD Air Quality Analysis Modeling Report PTTGC America, LLC > Dilles Bottom* document.

Table 2: NAAQS Modeling Results

Pollutant/Averaging Period	NAAQS ($\mu g/m^3$)	Modeled Results ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Exceeds NAAQS?
PM10 24-hr	150	7.4	41.0	48.4	NO
PM2.5 24-hr	35	6.7	19.8	26.5	NO
PM2.5 Annual	12	1.1	8.8	9.9	NO
NO2 1-hr	188	113.4	56.5	169.9	NO
NO2 Annual	100	2.9	12.8	15.7	NO

Cumulative modeling indicated no exceedance of any NAAQS, inclusive of off-site sources and conservative background concentrations.

Secondary $PM_{2.5}$ Formation Analysis

Pursuant to USEPA guidance for addressing secondary formation of $PM_{2.5}$ in a compliance demonstration under the PSD program, Trinity submitted an analysis of secondary $PM_{2.5}$ formation based on the SO_2 and NO_x emissions from the facility. Ohio EPA reviewed the analysis submitted and is in agreement that secondary $PM_{2.5}$ formation will not contribute to an exceedance of any $PM_{2.5}$ standard. Trinity assessed the project's impacts using the December 2, 2016 and February 23, 2017 Draft Modeled Emission Rates for Precursors (MERPs) Tier 1 assessment techniques.

Ozone Formation Analysis

Trinity applied the above Draft MERPs methodology to ozone and determined that secondarily formed ozone from this project will be insignificant.

Air Toxics Modeling

PTTGCA's assessment was based on a tiered approach that first identified any air toxic as defined in OAC rule 3745-114-01 in excess of 1 ton per year. For each air toxic in excess of one (1) ton per year, a second-tier evaluation was performed to determine if such emissions were exempt from modeling as specified in Engineering Guide (EG) #70 or were subject to a MACT standard and as such would not be subject to air toxic modeling requirements. PTTGCA identified three (3) toxic air contaminants in excess of one ton per year: hexane, ammonia, and ethyl chloride.

Hexane emissions are generated from fuel combustion in the cracking furnaces and plant steam boilers. PTTGCA indicated that as specified in EG #70, emissions from combustion sources such as those that burn fossil fuels exclusively do not need to be evaluated for air toxics. PTTGCA indicated that natural gas was the fossil fuel used and therefore exempt from an air toxics evaluation. Ohio EPA would clarify that the cracking furnaces will, under normal operating conditions, actually burn mostly rich hydrogen tail gas and methane fuel gas generated by the ethylene manufacturing process. The composition of the tail gas and fuel gas are such that emissions from the combustion of these streams is best represented by natural gas combustion including the quantification of air toxic compounds. Given that the emissions from these fuel streams are represented by natural gas, Ohio EPA agrees that the combustion sources are not required to perform an evaluation for air toxics. It should be noted that cracking furnace operations also involve decoking which resulted in air toxic emission below the one (1) ton per year threshold.

PTTGCA identified fugitive emissions of ethyl chloride in excess of one (1) ton per year, but properly indicated an air toxics impact evaluation would not be required since the fugitive emissions are subject to MACT Subpart H regarding equipment leak requirements.

Even though emitted at <1 ton per year, Ohio EPA also evaluated chromium emissions from the catalyst activation process in the polyethylene manufacturing operation. Ohio EPA is taking the position that the emissions from the catalyst activation process will be subject to MACT Subpart FFFF which requires process vents with $\geq$ 150 lbs/yr of uncontrolled HAP metal emissions to reduce the overall emission of HAP metals by $\geq$ 97% by weight. Given that PTTGCA has presented the use of chromium-based catalysts as an option (along with Ziegler type catalysts as), permit requirements for the polyethylene process will reflect the requirements of MACT Subpart FFFF to these emissions, and as such, would not be subject to an air toxics evaluation.

Ammonia slip emissions from the selective catalytic reduction (SCR) controls employed on the cracking furnaces was modeled to show conformance with Ohio's air toxics requirements. After reviewing the modeling analysis of air toxic ammonia for the proposed installation, Ohio EPA found no exceedances of the MAGLC. Ohio EPA agrees with the modeled maximum 1-hr ground level concentration of ammonia presented in Table 6-4 of the document PSD Air Quality Analysis Modeling Report PTTGC America, LLC > Dilles Bottom. The MAGLC for ammonia is 414.60 g/m3, and the project's maximum impact was demonstrated to be 29.95 g/m3.

Soils, Vegetation, and Visibility Analyses

Modeling was performed to assess potential impacts of the PTTGCA project on soils and vegetation. Table 8-1 of the *PSD Air Quality Analysis Modeling Report PTTGC America, LLC > Dilles Bottom* document indicate that the project's impacts are below both the secondary NAAQS and appropriate U.S. EPA screening levels. Ohio EPA concurs with the findings that the proposed project will not adversely impact soils and vegetation.

A visibility analysis was conducted using the VISCREEN model at the nearby Grand Vue Park in Moundsville, West Virginia. No visibility impairment was demonstrated by the project. The results of this assessment are presented in Tables 8-3 and 8-4 of the *PSD Air Quality Analysis Modeling Report PTTGC America, LLC > Dilles Bottom.*

Conclusion

Based upon the review of the permit to install application and the supporting documentation provided by the applicant, the Ohio EPA staff has determined the proposed installation will comply with all applicable State and Federal environmental regulations and the requirements for BACT are satisfied. Therefore, the Ohio EPA staff recommends a permit to install be issued to PTTGCA for the proposed installation.

PUBLIC NOTICE

The following matters are the subject of this public notice by the Ohio Environmental Protection Agency. The complete public notice, including any additional instructions for submitting comments, requesting information, a public hearing, or filing an appeal may be obtained at: http://epa.ohio.gov/actions.aspx or Hearing Clerk, Ohio EPA, 50 W. Town St., Columbus, Ohio 43215. Ph: 614-644-2129 email: HClerk@epa.ohio.gov

Draft Air Pollution Permit-to-Install Initial Installation
PTTGCA Petrochemical Complex
57246 Ferry Landing Rd,, Shadyside, OH 43947
ID#:P0124972
Date of Action: 10/19/2018
Permit Desc: Initial draft, air pollution installation permit for a petrochemical complex composed of ethylene and ethylene-based derivative plants to manufacture high-density polyethylene (HDPE) and linear low-density polyethylene/HDPE (LLDPE/HDPE). The petrochemical complex will also involve onsite railcar and truck loading, supporting utilities, infrastructure, storage tanks, logistics facilities, and facilities to produce and/or provide required natural gas, water, air, nitrogen, steam, and electricity to support the operation of process units.
This facility will generate emissions including carbon monoxide (CO), nitrogen oxide (NOx), volatile organic compounds (VOC), small sized particulate matter (PM10/PM2.5), and greenhouse gases (GHG). A public hearing and information session on the draft air permit is scheduled for 6 p.m., Tuesday, November 27, 2018, at Shadyside High School, 3890 Lincoln Ave., Shadyside, OH 43947. A presiding officer will be present and may limit oral testimony to ensure that all parties are heard. All interested persons are entitled to attend or be represented and give written or oral comments on the draft permit at the hearing. Written comments must be received by Ohio EPA/Southeast District Office by December 3, 2018. Comments received after December 3, 2018 may not be considered to be a part of the official record. Written comments may be submitted at the hearing or sent to Kimbra Reinbold, Ohio EPA, DAPC Southeast District Office (SEDO), 2195 East Front Street, Logan, Ohio, 43138. Fax number: (740) 385-6490. Further information concerning this application, which is available for public inspection, may be secured from Kimbra Reinbold, Ohio EPA DAPC, SEDO at the above address during normal business hours. Telephone number: (740) 380-5245. The permit and complete instructions for requesting information or submitting comments may be obtained at: http://epa.ohio.gov/dapc/permitsonline.aspx by entering the ID # or: Kimbra Reinbold, Ohio EPA DAPC, Southeast District Office, 2195 Front St., Logan, OH 43138. Ph: (740)385-8501

DRAFT

Division of Air Pollution Control
Permit-to-Install
for
PTTGCA Petrochemical Complex

Facility ID:	0607135004
Permit Number:	P0124972
Permit Type:	Initial Installation
Issued:	10/19/2018
Effective:	To be entered upon final issuance

Ohio Environmental Protection Agency

Division of Air Pollution Control
Permit-to-Install
for
PTTGCA Petrochemical Complex

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Ohio Environmental Protection Agency

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Authorization

Facility ID:	0607135004
Facility Description:	Petrochemical Complex
Application Number(s):	A0061393, A0061757
Permit Number:	P0124972
Permit Description:	Initial installation permit for a world-scale petrochemical complex composed of ethylene and ethylene-based derivative plants to manufacture high-density polyethylene (HDPE) and linear low-density polyethylene/HDPE (LLDPE/HDPE) with the following design capacities: Ethylene Plant: 1,500 KT/year; HDPE Units: two (2) trains of 350 KT/year for each train; and LLDPE/HDPE Units: two (2) trains of 450 KT/year for each train. The petrochemical complex will also involve onsite railcar and truck loading, supporting utilities, infrastructure, storage tanks, logistics facilities, and facilities to produce and/or provide required natural gas, water, air, nitrogen, steam, and electricity to support the operation of process units.
Permit Type:	Initial Installation
Permit Fee:	$81,240.00 *DO NOT send payment at this time, subject to change before final issuance*
Issue Date:	10/19/2018
Effective Date:	To be entered upon final issuance

This document constitutes issuance to:

PTTGCA Petrochemical Complex
57246 Ferry Landing Rd
Shadyside, OH 43947

of a Permit-to-Install for the emissions unit(s) identified on the following page.

Ohio Environmental Protection Agency (EPA) District Office or local air agency responsible for processing and administering your permit:

Ohio EPA DAPC, Southeast District Office
2195 Front St.
Logan, OH 43138
(740)385-8501

The above named entity is hereby granted a Permit-to-Install for the emissions unit(s) listed in this section pursuant to Chapter 3745-31 of the Ohio Administrative Code. Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the emissions unit(s) of environmental pollutants will operate in compliance with applicable State and Federal laws and regulations, and does not constitute expressed or implied assurance that if constructed or modified in accordance with those plans and specifications, the above described emissions unit(s) of pollutants will be granted the necessary permits to operate (air) or NPDES permits as applicable.

This permit is granted subject to the conditions attached hereto.

Ohio Environmental Protection Agency

Craig W. Butler
Director

Authorization (continued)

Permit Number: P0124972
Permit Description: Initial installation permit for a world-scale petrochemical complex composed of ethylene and ethylene-based derivative plants to manufacture high-density polyethylene (HDPE) and linear low-density polyethylene/HDPE (LLDPE/HDPE) with the following design capacities: Ethylene Plant: 1,500 KT/year; HDPE Units: two (2) trains of 350 KT/year for each train; and LLDPE/HDPE Units: two (2) trains of 450 KT/year for each train. The petrochemical complex will also involve onsite railcar and truck loading, supporting utilities, infrastructure, storage tanks, logistics facilities, and facilities to produce and/or provide required natural gas, water, air, nitrogen, steam, and electricity to support the operation of process units.

Permits for the following Emissions Unit(s) or groups of Emissions Units are in this document as indicated below:

Emissions Unit ID:	**F001**
Company Equipment ID:	Facility Roadways
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**J001**
Company Equipment ID:	Light and Heavy Pygas Rail Loading
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P003**
Company Equipment ID:	High Pressure Ground Flare
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P004**
Company Equipment ID:	Low Pressure Ground Flare
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P007**
Company Equipment ID:	OSBL Emergency Generator
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P011**
Company Equipment ID:	Cooling Tower
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P801**
Company Equipment ID:	Ethylene Manufacturing Unit
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P802**
Company Equipment ID:	HDPE Unit 1
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Emissions Unit ID:	**P803**
Company Equipment ID:	HDPE Unit 2
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P804**
Company Equipment ID:	LLDPE/HDPE Unit 3
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P805**
Company Equipment ID:	LLDPE/HDPE Unit 4
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P806**
Company Equipment ID:	Wastewater Collection and Treatment
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P807**
Company Equipment ID:	Fugitive Emissions
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Group Name: 1,000 kW Emergency Generators

Emissions Unit ID:	**P008**
Company Equipment ID:	ECU Emergency Generator
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P009**
Company Equipment ID:	PE 1&2 Emergency Generator
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P010**
Company Equipment ID:	PE 3&4 Emergency Generator
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Group Name: Ethane Cracking Furnaces

Emissions Unit ID:	**B001**
Company Equipment ID:	Ethane Cracking Furnace 1
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**B002**
Company Equipment ID:	Ethane Cracking Furnace 2
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**B003**
Company Equipment ID:	Ethane Cracking Furnace 3
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**B004**
Company Equipment ID:	Ethane Cracking Furnace 4
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Emissions Unit ID:	**B005**
Company Equipment ID:	Ethane Cracking Furnace 5
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**B006**
Company Equipment ID:	Ethane Cracking Furnace 6
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Group Name: Firewater Pumps

Emissions Unit ID:	**P005**
Company Equipment ID:	Firewater Pump 1
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P006**
Company Equipment ID:	Firewater Pump 2
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Group Name: HDPE Railcar Loading

Emissions Unit ID:	**P901**
Company Equipment ID:	HDPE Railcar Loading 1
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P902**
Company Equipment ID:	HDPE Railcar Loading 2
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Group Name: OSBL Thermal Oxidizers

Emissions Unit ID:	**P001**
Company Equipment ID:	OSBL Thermal Oxidizer 1
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**P002**
Company Equipment ID:	OSBL Thermal Oxidizer 2
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Group Name: Steam Boilers

Emissions Unit ID:	**B007**
Company Equipment ID:	Steam Boiler 1
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable
Emissions Unit ID:	**B008**
Company Equipment ID:	Steam Boiler 2
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

Emissions Unit ID:	**B009**
Company Equipment ID:	Steam Boiler 3
Superseded Permit Number:	
General Permit Category and Type:	Not Applicable

A. Standard Terms and Conditions

1. Federally Enforceable Standard Terms and Conditions

a) All Standard Terms and Conditions are federally enforceable, with the exception of those listed below which are enforceable under State law only:

(1) Standard Term and Condition A.2.a), Severability Clause

(2) Standard Term and Condition A.3.c) through A. 3.e) General Requirements

(3) Standard Term and Condition A.6.c) and A. 6.d), Compliance Requirements

(4) Standard Term and Condition A.9., Reporting Requirements

(5) Standard Term and Condition A.10., Applicability

(6) Standard Term and Condition A.11.b) through A.11.e), Construction of New Source(s) and Authorization to Install

(7) Standard Term and Condition A.14., Public Disclosure

(8) Standard Term and Condition A.15., Additional Reporting Requirements When There Are No Deviations of Federally Enforceable Emission Limitations, Operational Restrictions, or Control Device Operating Parameter Limitations

(9) Standard Term and Condition A.16., Fees

(10) Standard Term and Condition A.17., Permit Transfers

2. Severability Clause

a) A determination that any term or condition of this permit is invalid shall not invalidate the force or effect of any other term or condition thereof, except to the extent that any other term or condition depends in whole or in part for its operation or implementation upon the term or condition declared invalid.

b) All terms and conditions designated in parts B and C of this permit are federally enforceable as a practical matter, if they are required under the Act, or any of its applicable requirements, including relevant provisions designed to limit the potential to emit of a source, are enforceable by the Administrator of the U.S. EPA and the State and by citizens (to the extent allowed by section 304 of the Act) under the Act. Terms and conditions in parts B and C of this permit shall not be federally enforceable and shall be enforceable under State law only, only if specifically identified in this permit as such.

3. General Requirements

a) Any noncompliance with the federally enforceable terms and conditions of this permit constitutes a violation of the Act, and is grounds for enforcement action or for permit revocation, revocation and re-issuance, or modification.

b) It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the federally enforceable terms and conditions of this permit.

c) This permit may be modified, revoked, or revoked and reissued, for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or revocation, or of a notification of planned changes or anticipated noncompliance does not stay any term and condition of this permit.

d) This permit does not convey any property rights of any sort, or any exclusive privilege.

e) The permittee shall furnish to the Director of the Ohio EPA, or an authorized representative of the Director, upon receipt of a written request and within a reasonable time, any information that may be requested to determine whether cause exists for modifying or revoking this permit or to determine compliance with this permit. Upon request, the permittee shall also furnish to the Director or an authorized representative of the Director, copies of records required to be kept by this permit. For information claimed to be confidential in the submittal to the Director, if the Administrator of the U.S. EPA requests such information, the permittee may furnish such records directly to the Administrator along with a claim of confidentiality.

4. Monitoring and Related Record Keeping and Reporting Requirements

a) Except as may otherwise be provided in the terms and conditions for a specific emissions unit, the permittee shall maintain records that include the following, where applicable, for any required monitoring under this permit:

(1) The date, place (as defined in the permit), and time of sampling or measurements.

(2) The date(s) analyses were performed.

(3) The company or entity that performed the analyses.

(4) The analytical techniques or methods used.

(5) The results of such analyses.

(6) The operating conditions existing at the time of sampling or measurement.

b) Each record of any monitoring data, testing data, and support information required pursuant to this permit shall be retained for a period of five years from the date the record was created. Support information shall include, but not be limited to all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. Such records may be maintained in computerized form.

c) Except as may otherwise be provided in the terms and conditions for a specific emissions unit, the permittee shall submit required reports in the following manner:

(1) Reports of any required monitoring and/or recordkeeping of federally enforceable information shall be submitted to the Ohio EPA DAPC, Southeast District Office.

(2) Quarterly written reports of (i) any deviations from federally enforceable emission limitations, operational restrictions, and control device operating parameter limitations, excluding deviations resulting from malfunctions reported in accordance with OAC rule 3745-15-06, that have been detected by the testing, monitoring and recordkeeping requirements specified in this permit, (ii) the probable cause of such deviations, and (iii) any corrective actions or preventive measures taken, shall be made to the Ohio EPA DAPC, Southeast District Office. The written reports shall be submitted quarterly, by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters. See A.15. below if no deviations occurred during the quarter.

(3) Written reports, which identify any deviations from the federally enforceable monitoring, recordkeeping, and reporting requirements contained in this permit shall be submitted to the Ohio EPA DAPC, Southeast District Office every six months, by January 31 and July 31 of each year for the previous six calendar months. If no deviations occurred during a six-month period, the permittee shall submit a semi-annual report, which states that no deviations occurred during that period.

(4) This permit is for an emissions unit located at a Title V facility. Each written report shall be signed by a responsible official certifying that, based on information and belief formed after reasonable inquiry, the statements and information in the report are true, accurate, and complete.

d) The permittee shall report actual emissions pursuant to OAC Chapter 3745-78 for the purpose of collecting Air Pollution Control Fees.

5. Scheduled Maintenance/Malfunction Reporting

Any scheduled maintenance of air pollution control equipment shall be performed in accordance with paragraph (A) of OAC rule 3745-15-06. The malfunction, i.e., upset, of any emissions units or any associated air pollution control system(s) shall be reported to the Ohio EPA DAPC, Southeast District Office in accordance with paragraph (B) of OAC rule 3745-15-06. (The definition of an upset condition shall be the same as that used in OAC rule 3745-15-06(B)(1) for a malfunction.) The verbal and written reports shall be submitted pursuant to OAC rule 3745-15-06.

Except as provided in that rule, any scheduled maintenance or malfunction necessitating the shutdown or bypassing of any air pollution control system(s) shall be accompanied by the shutdown of the emission unit(s) that is (are) served by such control system(s).

6. Compliance Requirements

a) All applications, notifications or reports required by terms and conditions in this permit to be submitted or "reported in writing" are to be submitted to Ohio EPA through the Ohio EPA's eBusiness Center: Air Services web service ("Air Services"). Ohio EPA will accept hard copy submittals on an as-needed basis if the permittee cannot submit the required documents through the Ohio EPA eBusiness Center. In the event of an alternative hard copy submission in lieu of the eBusiness Center, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submission of applications, notifications or reports required to be submitted to Ohio EPA fulfills the requirement to submit the required information to the Director, the appropriate Ohio EPA District Office or contracted local air agency, and/or any other individual or organization specifically identified as an

additional recipient identified in this permit unless otherwise specified. Consistent with OAC rule 3745-15-03, the electronic signature date shall constitute the date that the required application, notification or report is considered to be "submitted". Any document requiring signature may be represented by entry of the personal identification number (PIN) by responsible official as part of the electronic submission process or by the scanned attestation document signed by the Authorized Representative that is attached to the electronically submitted written report.

Any document (including reports) required to be submitted and required by a federally applicable requirement in this permit shall include a certification by a Responsible Official that, based on information and belief formed after reasonable inquiry, the statements in the document are true, accurate, and complete

b) Upon presentation of credentials and other documents as may be required by law, the permittee shall allow the Director of the Ohio EPA or an authorized representative of the Director to:

(1) At reasonable times, enter upon the permittee's premises where a source is located or the emissions-related activity is conducted, or where records must be kept under the conditions of this permit.

(2) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit, subject to the protection from disclosure to the public of confidential information consistent with ORC section 3704.08.

(3) Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit.

(4) As authorized by the Act, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit and applicable requirements.

c) The permittee shall submit progress reports to the Ohio EPA DAPC, Southeast District Office concerning any schedule of compliance for meeting an applicable requirement. Progress reports shall be submitted semiannually or more frequently if specified in the applicable requirement or by the Director of the Ohio EPA. Progress reports shall contain the following:

(1) Dates for achieving the activities, milestones, or compliance required in any schedule of compliance, and dates when such activities, milestones, or compliance were achieved.

(2) An explanation of why any dates in any schedule of compliance were not or will not be met, and any preventive or corrective measures adopted.

7. Best Available Technology

As specified in OAC Rule 3745-31-05, new sources that must employ Best Available Technology (BAT) shall comply with the Applicable Emission Limitations/Control Measures identified as BAT for each subject emissions unit.

8. Air Pollution Nuisance

The air contaminants emitted by the emissions units covered by this permit shall not cause a public nuisance, in violation of OAC rule 3745-15-07.

9. Reporting Requirements

The permittee shall submit required reports in the following manner:

a) Reports of any required monitoring and/or recordkeeping of state-only enforceable information shall be submitted to the Ohio EPA DAPC, Southeast District Office.

b) Except as otherwise may be provided in the terms and conditions for a specific emissions unit, quarterly written reports of (a) any deviations (excursions) from state-only required emission limitations, operational restrictions, and control device operating parameter limitations that have been detected by the testing, monitoring, and recordkeeping requirements specified in this permit, (b) the probable cause of such deviations, and (c) any corrective actions or preventive measures which have been or will be taken, shall be submitted to the Ohio EPA DAPC, Southeast District Office. If no deviations occurred during a calendar quarter, the permittee shall submit a quarterly report, which states that no deviations occurred during that quarter. The reports shall be submitted quarterly, by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters. (These quarterly reports shall exclude deviations resulting from malfunctions reported in accordance with OAC rule 3745-15-06.)

10. Applicability

This Permit-to-Install is applicable only to the emissions unit(s) identified in the Permit-to-Install. Separate application must be made to the Director for the installation or modification of any other emissions unit(s) not exempt from the requirement to obtain a Permit-to-Install.

11. Construction of New Sources(s) and Authorization to Install

a) This permit does not constitute an assurance that the proposed source will operate in compliance with all Ohio laws and regulations. This permit does not constitute expressed or implied assurance that the proposed facility has been constructed in accordance with the application and terms and conditions of this permit. The action of beginning and/or completing construction prior to obtaining the Director's approval constitutes a violation of OAC rule 3745-31-02. Furthermore, issuance of this permit does not constitute an assurance that the proposed source will operate in compliance with all Ohio laws and regulations. Issuance of this permit is not to be construed as a waiver of any rights that the Ohio Environmental Protection Agency (or other persons) may have against the applicant for starting construction prior to the effective date of the permit. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed facilities cannot meet the requirements of this permit or cannot meet applicable standards.

b) If applicable, authorization to install any new emissions unit included in this permit shall terminate within eighteen months of the effective date of the permit if the owner or operator has not undertaken a continuing program of installation or has not entered into a binding contractual obligation to undertake and complete within a reasonable time a continuing program of installation. This deadline may be extended by up to 12 months if application is made to the

Director within a reasonable time before the termination date and the permittee shows good cause for any such extension.

c) The permittee may notify Ohio EPA of any emissions unit that is permanently shut down (i.e., the emissions unit has been physically removed from service or has been altered in such a way that it can no longer operate without a subsequent "modification" or "installation" as defined in OAC Chapter 3745-31) by submitting a certification from the authorized official that identifies the date on which the emissions unit was permanently shut down. Authorization to operate the affected emissions unit shall cease upon the date certified by the authorized official that the emissions unit was permanently shut down. At a minimum, notification of permanent shut down shall be made or confirmed by marking the affected emissions unit(s) as "permanently shut down" in "Air Services" along with the date the emissions unit(s) was permanently removed and/or disabled. Submitting the facility profile update electronically will constitute notifying the Director of the permanent shutdown of the affected emissions unit(s).

d) The provisions of this permit shall cease to be enforceable for each affected emissions unit after the date on which an emissions unit is permanently shut down (i.e., emissions unit has been physically removed from service or has been altered in such a way that it can no longer operate without a subsequent "modification" or "installation" as defined in OAC Chapter 3745-31). All records relating to any permanently shutdown emissions unit, generated while the emissions unit was in operation, must be maintained in accordance with law. All reports required by this permit must be submitted for any period an affected emissions unit operated prior to permanent shut down. At a minimum, the permit requirements must be evaluated as part of the reporting requirements identified in this permit covering the last period the emissions unit operated.

Unless otherwise exempted, no emissions unit certified by the responsible official as being permanently shut down may resume operation without first applying for and obtaining a permit pursuant to OAC Chapter 3745-31 and OAC Chapter 3745-77 if the restarted operation is subject to one or more applicable requirements.

e) The permittee shall comply with any residual requirements related to this permit, such as the requirement to submit a deviation report, air fee emission report, or other any reporting required by this permit for the period the operating provisions of this permit were enforceable, or as required by regulation or law. All reports shall be submitted in a form and manner prescribed by the Director. All records relating to this permit must be maintained in accordance with law.

12. Permit-To-Operate Application

The permittee is required to apply for a Title V permit pursuant to OAC Chapter 3745-77. The permittee shall submit a complete Title V permit application or a complete Title V permit modification application within twelve (12) months after commencing operation of the emissions units covered by this permit. However, if operation of the proposed new or modified source(s) as authorized by this permit would be prohibited by the terms and conditions of an existing Title V permit, a Title V permit modification of such new or modified source(s) pursuant to OAC rule 3745-77-04(D) and OAC rule 3745-77-08(C)(3)(d) must be obtained before operating the source in a manner that would violate the existing Title V permit requirements.

13. Construction Compliance Certification

The applicant shall identify the following dates in the "Air Services" facility profile for each new emissions unit identified in this permit.

a) Completion of initial installation date shall be entered upon completion of construction and prior to start-up.

b) Commence operation after installation or latest modification date shall be entered within 90 days after commencing operation of the applicable emissions unit.

14. Public Disclosure

The facility is hereby notified that this permit, and all agency records concerning the operation of this permitted source, are subject to public disclosure in accordance with OAC rule 3745-49-03.

15. Additional Reporting Requirements When There Are No Deviations of Federally Enforceable Emission Limitations, Operational Restrictions, or Control Device Operating Parameter Limitations

If no deviations occurred during a calendar quarter, the permittee shall submit a quarterly report, which states that no deviations occurred during that quarter. The reports shall be submitted quarterly by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters.

16. Fees

The permittee shall pay fees to the Director of the Ohio EPA in accordance with ORC section 3745.11 and OAC Chapter 3745-78. The permittee shall pay all applicable permit-to-install fees within 30 days after the issuance of any permit-to-install. The permittee shall pay all applicable permit-to-operate fees within thirty days of the issuance of the invoice.

17. Permit Transfers

Any transferee of this permit shall assume the responsibilities of the prior permit holder. The new owner must update and submit the ownership information via the "Owner/Contact Change" functionality in "Air Services" once the transfer is legally completed. The change must be submitted through "Air Services" within thirty days of the ownership transfer date.

18. Risk Management Plans

If the permittee is required to develop and register a risk management plan pursuant to section 112(r) of the Clean Air Act, as amended, 42 U.S.C. 7401 et seq. ("Act"), the permittee shall comply with the requirement to register such a plan.

19. Title IV Provisions

If the permittee is subject to the requirements of 40 CFR Part 72 concerning acid rain, the permittee shall ensure that any affected emissions unit complies with those requirements. Emissions exceeding any allowances that are lawfully held under Title IV of the Act, or any regulations adopted thereunder, are prohibited.

B. Facility-Wide Terms and Conditions

1. All the following facility-wide terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

   a) B.16.

2. The following emissions units are also being installed as part of this project:

EU ID	EU Description (Tank ID)	BACT Requirement	Emission Rates (pounds/year)	Other Applicable Requirements
T002	Ethylene Rundown Storage Tank (T-4802)	Vent to high-pressure flare (EU P003) with a minimum 98.0% destruction efficiency	See EU P003	N/A
T003	Light Pygas Storage Tank 1 (T-4804A)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 or P002	NSPS Subpart Kb and 40 CFR Part 63 Subparts SS and YY
T004	Light Pygas Storage Tank 2 (T-4804B)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 or P002	NSPS Subpart Kb and 40 CFR Part 63 Subparts SS and YY
T005	Heavy Pygas Storage Tank 1 (T-4805A)	Vent to thermal oxidizer (EU P001) with a minimum 99.5% destruction efficiency	See EUs P001 or P002	NSPS Subpart Kb and 40 CFR Part 63 Subparts SS and YY
T006	Heavy Pygas Storage Tank 2 (T-4805B)	Vent to thermal oxidizer (EU P001) with a minimum 99.5% destruction efficiency	See EUs P001 or P002	NSPS Subpart Kb and 40 CFR Part 63 Subparts SS and YY
T007	Off-Spec Ethylene Storage Bullets (V-4806A and V-4806B)	Vent to high pressure flare (EU P003) with a minimum 98.0% destruction efficiency	See EU P003	N/A

T008	Spent Caustic Storage Tank (T-3501)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 and P002	NESHAP Subpart FF and MACT Subpart XX
T009	Spent Caustic Storage Standby Tank (T-3511)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 and P002	NSPS Subpart Kb, NESHAP Subpart FF and MACT Subpart XX
T010	1-Butene Storage Bullets (V-4808A and V-4808B)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 and P002	N/A
T011	1-Hexene Storage Tank (T-4809)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 and P002	NSPS Subpart Kb
T012	i-Butane Storage Bullet (V-4810)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 and P002	N/A
T013	Propane Storage Bullet (5T-V-4803A)	Vent to high pressure flare (EU P003) with a minimum 98.0% destruction efficiency	See EU P003	N/A
T014	i-Pentane Storage Bullet (V-4811)	Vent to thermal oxidizer (EUs P001 or P002) with a minimum 99.5% destruction efficiency	See EUs P001 and P002	N/A

3. If applicable, the permittee shall develop and register a risk management plan pursuant to section 112(r) of the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq. ("Act") no later than the date on which a regulated substance is first present above a threshold quantity in a process.

4. The following emissions units contained in this permit are subject to 40 CFR Part 63, Subpart YY: B001-B006. The complete MACT requirements, including the MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulations (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

5. The following emissions units contained in this permit are subject to 40 CFR Part 60, Subpart Db and 40 CFR Part 63, Subpart DDDDD: B007-B009. The complete NSPS and MACT requirements, including the NSPS and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

6. Pursuant to OAC rule 3745-14-01(C)(1)(b)(iii), emissions units B007-B009 are subject to the NOx Budget Trading Program (OAC Chapter 3745-14). OAC Chapter 3745-14 is currently under revision. The permittee must comply with any applicable requirements that become effective during the permit term and replace the existing NOx budget trading program applicable requirements.

7. The following emissions unit contained in this permit is subject to 40 CFR Part 60, Subparts Kb, VVa, NNN and RRR, 40 CFR Part 61, Subparts J and V, and 40 CFR Part 63, Subparts SS, UU, XX and YY: P801. The complete NSPS, NESHAP and MACT requirements, including the NSPS, NESHAP and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

8. The following emissions units contained in this permit are subject to 40 CFR Part 60, Subpart DDD and 40 CFR Part 63, Subparts SS and FFFF and DDDDD: P802, P803, P804, and P805. The complete NSPS and MACT requirements, including the NSPS and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

9. The following emissions units contained in this permit are subject to 40 CFR Part 60, Subparts Kb, DDD, NNN and RRR, 40 CFR Part 61, Subpart FF and 40 CFR Part 63, Subparts G, FFF, SS and YY: P001 and P002. The complete NSPS, NESHAP and MACT requirements, including the NSPS, NESHAP and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

10. The following emissions unit contained in this permit is subject to 40 CFR Part 60, Subparts NNN and RRR and 40 CFR Part 63, Subparts SS and YY: P003 and P004. The complete NSPS and MACT requirements, including the NSPS and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

11. The following emissions unit contained in this permit is subject to 40 CFR Part 61, Subpart FF and 40 CFR Part 63, Subparts XX, YY and FFFF: P806. The complete NESHAP and MACT requirements,

including the NESHAP and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

12. The following emissions unit contained in this permit is subject to 40 CFR Part 60, Subpart VVa, 40 CFR Part 61, Subpart J and V and 40 CFR Part 63, Subparts F, H, SS and UU: P807. The complete NSPS, NESHAP and MACT requirements, including the NSPS, NESHAP and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

13. The following emissions units contained in this permit are subject to 40 CFR Part 60, Subpart VVa: J001. The complete NSPS requirements, including the NSPS General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

14. The following emissions units contained in this permit are subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 63, Subpart ZZZZ: P005-P010. The complete NSPS and MACT requirements, including the NSPS and MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulation (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

15. The following emissions unit contained in this permit is subject to 40 CFR Part 63, Subparts F, XX and YY: P011. The complete MACT requirements, including the MACT General Provisions, may be accessed via the internet from the Electronic Code of Federal Regulations (e-CFR) website http://www.ecfr.gov or by contacting the Ohio EPA, Southeast District Office.

16. Except for ammonia emitted from the selective catalytic reduction (SCR) units controlling NO_x emissions from emissions units B001-B006 (see Section C.1.), modeling for toxic air contaminants was not required for this project pursuant to Engineering Guide #70, Question 3 because HAP emissions are subject to 40 CFR Part 63 as identified above or because the maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year for the project. OAC Chapter 3745-31 requires permittees to apply for and obtain a new or modified permit-to-install prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any inorganic toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new permit-to-install.

C. Emissions Unit Terms and Conditions

1. Emissions Unit Group - Ethane Cracking Furnaces: B001 - B006

EU ID	Operations, Property and/or Equipment Description
B001	Ethane Cracking Furnace 1 (B-10101); 552 MMBtu/hour tail gas and natural gas-fired cracking furnace equipped with low-NO_x burners (LNBs) and controlled by selective catalytic reduction (SCR)
B002	Ethane Cracking Furnace 2 (B-10201); 552 MMBtu/hour tail gas and natural gas-fired cracking furnace equipped with LNBs and controlled by SCR
B003	Ethane Cracking Furnace 3 (B-10301); 552 MMBtu/hour tail gas and natural gas-fired cracking furnace equipped with LMBs and controlled by SCR
B004	Ethane Cracking Furnace 4 (B-10401); 552 MMBtu/hour tail gas and natural gas-fired cracking furnace equipped with LNBs and controlled by SCR
B005	Ethane Cracking Furnace 5 (B-10501); 552 MMBtu/hour tail gas and natural gas-fired cracking furnace equipped with LMBs and controlled by SCR
B006	Ethane Cracking Furnace 6 (B-10601); 552 MMBtu/hour tail gas and natural gas-fired cracking furnace equipped with LNBs and controlled by SCR

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)d., b)(1)j., b)(2)h., d)(10)-(13) and e)(5)

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Nitrogen oxides (NO_x) emissions shall not exceed 0.010 lb/MMBtu as a rolling, 12-month average, excluding periods of startup, shutdown and hot steam standby. NO_x emissions shall not exceed 0.0135 lb/MMBtu as an hourly maximum during normal operation and 7.45 lbs/hr, excluding periods of startup, shutdown and hot steam standby. NO_x emissions shall not exceed 0.015 lb/MMBtu as a 3-hour average and 2.18 lbs/hr during decoking. NO_x emissions shall not exceed 0.050 lb/MMBtu as a three-hour average and

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		27.60 lbs/hr during periods of startup, shutdown and hot steam standby. Carbon monoxide (CO) emissions shall not exceed 0.035 lb/MMBtu as a 12-month rolling average and 19.32 lbs/hr. CO emissions shall not exceed 5.08 lbs/hr during decoking. Volatile organic compound (VOC) emissions shall not exceed 0.008 lb/MMBtu and 4.42 lbs/hr. Particulate emissions (PE) shall not exceed 0.005 lb/MMBtu and 2.76 lbs/hr, excluding periods of decoking. PE shall not exceed 0.019 lb/MMBtu and 2.76 lbs/hr during decoking. Emissions of particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) shall not exceed 0.005 lb/MMBtu and 2.76 lbs/hr, excluding periods of decoking. PM_{10} and $PM_{2.5}$ emissions shall not exceed 0.010 lb/MMBtu and 1.45 lbs/hr during decoking. Emissions from emissions units B001-B006, combined, shall not exceed: 144.00 tons of NO_x per rolling, 12-month period. 500.00 tons of CO per rolling, 12-month period. 122.00 tons of VOC per rolling, 12-month period. 72.59 tons of PE per rolling, 12-month period. 71.89 tons of PM_{10} and PM2.5 per rolling,

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		12-month period. 1,673,240 tons of carbon dioxide equivalents (CO_2e) per rolling, 12-month period. The requirements of this rule include compliance with OAC rule 3745-17-07(A). See b)(2)a.-f. below.
b.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	The requirements of this rule are equivalent to the requirements of OAC rules 3745-31-10 through 3745-31-20 for NO_x, CO, VOC, PE, PM_{10} and $PM_{2.5}$. Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the CO_2e emissions from this air contaminant source pursuant to OAC rule 3745-31-34(E)(8).
c.	OAC rule 3745-31-05(A)(3), as effective 6/30/08	See b)(2)g. and c)(3) below.
d.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective 6/30/08	BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the SO_2 emissions from this air contaminant source since the potential to emit is less than 10 tons/year. See b)(2)h. below.
e.	OAC rule 3745-17-10(B)(1)	The emissions limitation required by this rule for operations excluding decoking is less stringent than the emissions limitation for PE required for operations excluding decoking pursuant to OAC rules 3745-31-10 through 3745-31-20.
f.	OAC rule 3745-17-11(B)	The emissions limitation required by this rule for decoking operations is less stringent than the emissions limitation for PE required for decoking operations pursuant to OAC rules 3745-31-10 through 3745-31-20.
g.	OAC rule 3745-17-07(A)	Visible PE from any stack shall not exceed 20 percent opacity, except as provided by the rule.
h.	OAC rule 3745-18-06	See b)(2)i. below.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
i.	40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114) [In accordance with Table 1 to 40 CFR 63.1100(a) and 63.1103(e)(1)(i)(G), this emissions unit is a new ethylene cracking furnace and associated decoking operations located at a major source of HAP emissions subject to the emissions limitations/control measures specified in this section.]	An ethylene cracking furnace covered by 40 CFR Part 63, Subpart YY, is not subject to 40 CFR Part 63, Subpart DDDDD. [40 CFR 63.7491(f)] Air emissions from all ethylene cracking furnaces, including emissions during decoking operations, are not subject to the requirements of 40 CFR 63.1103(e)(3). [40 CFR 63.1103(e)(1)(ii)(J)]
j.	ORC 3704.03(F) and OAC rule 3745-114-01	Toxic Air Contaminants

(2) Additional Terms and Conditions

a. Operating modes of the ethane cracking furnaces are defined as follows:

Operating Mode	Definition
Startup	The period beginning when fuel is introduced to the furnace and ending when the SCR catalyst bed reaches its stable operating temperature. A planned startup for each furnace is limited to 24 hours at 25% or less of the maximum allowable firing rate.
Normal	During normal operations, six furnaces will operate in parallel for ethylene production and will use tail gas as primary (85%) fuel and natural gas as supplement fuel (about 15%). Under normal conditions, about 65% of ethane feed is converted to ethylene and its derivatives.
Decoking	During the cracking process, there is coke formation inside the furnace tubes that requires periodic decoking for efficient cracker operation. Every 45 to 60 days a furnace will go through decoking, which will last for approximately 36 hours. The coke buildup is removed during this mode of operation. The heat input rate required during decoking is about 30% of the furnace's normal heat input. Once a furnace has been decoked, it is placed into hot steam standby (HSSB) or normal operation.
Hot Steam Standby	Once a furnace has been decoked, it is placed into HSSB mode. During this mode, the furnace has steam flowing through it at its minimum firing rate which is only

	about 20-25% of the furnace's normal heat input. In a typical operating cycle of a cracker, this mode only lasts for about 4 hours, before it is ready for normal operations. The furnace discharge in this mode is routed to the firebox for oxygen freeing and then to the quench tower.
Shutdown	The period beginning when the SCR catalyst bed first drops below its stable operating temperature and ending when the fuel is removed from the furnace.
Maintenance	Although decoking is considered periodic maintenance for the cracker, there may be process upsets that can damage the cracker and the cracker will be shut down. During this mode, the furnace will be cold and there will not be any fuel consumption.

b. As part of the Best Available Control Technology (BACT) determination for NO_x, each cracker furnace must be equipped with low-NOx burners and must be controlled with SCR with a control efficiency of at least 90%. Compliance with these requirements shall be demonstrated by compliance with the short-term NO_x emissions limitations in b)(1)a.

c. As part of the BACT determination for CO, compliance with the BACT requirements shall be demonstrated by compliance with the short-term CO emissions limitations in b)(1)a.

d. As part of the BACT determination for VOC, compliance with the BACT requirements shall be demonstrated by compliance with the short-term VOC emissions limitations in b)(1)a.

e. As part of the BACT determination for PE, PM_{10} and $PM_{2.5}$, compliance with the BACT requirements shall be demonstrated by compliance with the short-term PE, PM_{10} and $PM_{2.5}$ emissions limitations in b)(1)a. and the operational restriction in c)(1) below.

f. As part of the BACT determination for CO_2e, compliance with the BACT requirements shall be demonstrated by compliance with the CO_2e emissions limitation in b)(1)a. and the operational restriction in c)(2) below.

g. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

h. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

i. This emissions unit is not eligible for the exemption from the requirements in OAC rule 3745-18-06 pursuant to OAC rule 3745-18-06(A) because tail gas is burned in this emissions unit in addition to natural gas. However, this emissions unit is not subject to an SO_2 emissions limitation from OAC rule 3745-18-06(E)

pursuant to OAC rule 3745-18-01(B)(14) that excludes gaseous fuels from the definition of "process weight".

j. Continuous emission monitoring systems consist of all the equipment used to acquire data to provide a record of emissions and includes the sample extraction and transport hardware, sample conditioning hardware, analyzers, and data recording/processing hardware and software.

k. Each continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be certified to meet the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 2, 3 and 6. At least 45 days before commencing certification testing of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall develop and maintain a written quality assurance/quality control plan designed to ensure continuous valid and representative readings of NO_x and CO_2 or O_2 emissions from the continuous monitor(s), in units of the applicable standard(s). The plan shall follow the requirements of 40 CFR Part 60, Appendix F. The quality assurance/quality control plan and a logbook dedicated to the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) must be kept on site and available for inspection during regular office hours.

The plan shall include the requirement to conduct quarterly cylinder gas audits or relative accuracy audits as required in 40 CFR Part 60; and to conduct relative accuracy test audits in units of the standard(s), in accordance with and at the frequencies required per 40 CFR Part 60.

l. Each continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be certified to meet the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 3, 4 or 4a and 6. At least 45 days before commencing certification testing of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall develop and maintain a written quality assurance/quality control plan designed to ensure continuous valid and representative readings of CO and CO_2 or O_2 emissions from the continuous monitor(s), in units of the applicable standard(s). The plan shall follow the requirements of 40 CFR Part 60, Appendix F. The quality assurance/quality control plan and a logbook dedicated to the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) must be kept on site and available for inspection during regular office hours.

m. The plan shall include the requirement to conduct quarterly cylinder gas audits or relative accuracy audits as required in 40 CFR Part 60; and to conduct relative accuracy test audits in units of the standard(s), in accordance with and at the frequencies required per 40 CFR Part 60.

c) Operational Restrictions

(1) The exhaust gas generated from this emissions unit while operating in decoking mode shall be directed back into the furnace firebox to ensure complete combustion.

(2) During normal operation mode the exhaust gas temperature from the emissions unit stack shall not exceed 350°F based on a monthly, 12-month rolling average.

(3) The permittee shall burn only gaseous fuels (i.e., natural gas and tail gas) in this emissions unit. The sulfur content of gaseous fuels combusted shall not exceed 0.005 gr/dscf.

d) Monitoring and/or Recordkeeping Requirements

(1) Prior to the installation of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall submit information detailing the proposed location of the sampling site in accordance with the siting requirements in 40 CFR Part 60, Appendix B, Performance Specifications 2 and 3. The Ohio EPA, Central Office shall approve the proposed sampling site and certify that the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) meets the requirements of Performance Specifications 2, 3 and 6. Once received, the letter(s)/document(s) of certification shall be maintained on-site and shall be made available to the Director (the appropriate Ohio EPA District Office or local air agency) upon request.

(2) The permittee shall install, operate, and maintain equipment to continuously monitor and record NO_x and CO_2 or O_2 emissions from this emissions unit in units of the applicable standard(s). The continuous monitoring and recording equipment shall comply with the requirements specified in 40 CFR Part 60.

The permittee shall maintain records of all data obtained by the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) including, but not limited to:

a. emissions of NO_x in parts per million for each cycle time of the analyzer, with no resolution less than one data point per minute required;

b. emissions of NO_x in pounds per month;

c. the percent CO_2 or O_2 with each cycle time of the analyzer, with no resolution less than one data point per minute required;

d. results of quarterly cylinder gas audits;

e. results of daily zero/span calibration checks and the magnitude of manual calibration adjustments;

f. results of required relative accuracy test audit(s), including results in units of the applicable standard(s);

g. hours of operation of the emissions unit, continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), and control equipment;

h. the date, time, and hours of operation of the emissions unit without the control equipment and/or the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system);

i. the date, time, and hours of operation of the emissions unit during any malfunction of the control equipment and/or the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system); as well as,

j. the reason (if known) and the corrective actions taken (if any) for each such event in (h) and (i).

All valid data points generated and recorded by the continuous emission monitoring and data acquisition and handling system shall be used in the calculation of the pollutant concentration and/or emission rate over the appropriate averaging period.

(3) Prior to the installation of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall submit information detailing the proposed location of the sampling site in accordance with the siting requirements in 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4 or 4a (as appropriate). The Ohio EPA, Central Office shall approve the proposed sampling site and certify that the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) meets the requirements of Performance Specifications 2, 4 or 4a and 6. Once received, the letter(s)/document(s) of certification shall be maintained on-site and shall be made available to the Director (the appropriate Ohio EPA District Office or local air agency) upon request.

(4) The permittee shall operate and maintain equipment to continuously monitor and record CO and CO_2 or O_2 emissions from this emissions unit in units of the applicable standard(s). The continuous monitoring and recording equipment shall comply with the requirements specified in 40 CFR Part 60.

The permittee shall maintain records of all data obtained by the continuous CO monitoring system including, but not limited to:

a. emissions of CO in parts per million for each cycle time of the analyzer, with no resolution less than one data point per minute required;

b. emissions of CO in pounds per month;

c. the percent CO_2 or O_2 with each cycle time of the analyzer, with no resolution less than one data point per minute required;

d. results of quarterly cylinder gas audits;

e. results of daily zero/span calibration checks and the magnitude of manual calibration adjustments;

f. results of required relative accuracy test audit(s), including results in units of the applicable standard(s);

g. hours of operation of the emissions unit, continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), and control equipment;

h. the date, time, and hours of operation of the emissions unit without the control equipment and/or the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system);

i. the date, time, and hours of operation of the emissions unit during any malfunction of the control equipment and/or the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system); as well as,

j. the reason (if known) and the corrective actions taken (if any) for each such event in (h) and (i).

All valid data points generated and recorded by the continuous emission monitoring and data acquisition and handling system shall be used in the calculation of the pollutant concentration and/or emission rate over the appropriate averaging period.

(5) The permittee shall continuously monitor and record the exhaust gas temperature from the emissions unit stack.

(6) To ensure proper operation of the SCR, the permittee shall maintain an ammonia slip rate not to exceed 10 ppmv at 3% O_2. The permittee shall monitor for ammonia slip from this emissions unit a minimum of once each day for the first 60 days of operation by calculating ammonia emissions as the difference between the input ammonia, measured by the ammonia injection rate, and the ammonia reacted, measured by the differential NO_x upstream and downstream of the control device that injects urea or ammonia into the exhaust stream. The ammonia emissions must be calculated using the following equation:

NH_3 @ 3% O_2 = $[(a/b * 10^6) – c] * d$

Where:

a = ammonia injection rate, in pounds per hour/17 pound per pound-mol;

b = dry exhaust flow rate (lb/hr)/29 lb/lb-mol;

c = change in measured NOx concentration across catalyst (ppmv at reference oxygen); and

d = correction factor, the ratio of measured slip to calculated ammonia slip, where the measured slip is obtained from the stack testing for ammonia during the initial demonstration of compliance.

Monitoring for ammonia slip may be reduced to a minimum of once per week if operating procedures have been developed to prevent excess amounts of ammonia from being introduced in the control device and when operation of the control device has been

proven successful at controlling ammonia slip. Daily monitoring must resume when the catalyst is within 30 days of its useful life expectancy.

(7) The permittee shall maintain monthly records of the following information:

a. the hours this emissions unit operated in each operating mode;

b. the amount of gaseous fuel consumed in this emissions unit, in MMscf;

c. the heat content of the gaseous fuel combusted in this emissions unit, in MMBtu/MMscf;

d. the sulfur content of the gaseous fuel combusted in this emissions unit, in gr/dscf;

e. the total NO_x emissions for this emissions unit, in pounds, as recorded in d)(2)b.;

f. the total NOx emissions, in pounds, including startup/shutdown emissions, for emissions units B001-B006, combined;

g. the total CO emissions, in pounds, as recorded in d)(4)b.;

h. the total CO emissions, in pounds, including startup/shutdown emissions, for emissions units B001-B006, combined;

i. the total VOC emissions, in pounds, including startup/shutdown emissions, for this emissions unit, calculated by multiplying the VOC emissions factor of 0.008 lb/MMBtu, or the results of the most recent stack test, by the amount of gaseous fuel consumed, including periods of startup/shutdown, as recorded in d)(7)b. and the heat content of the natural gas consumed, as recorded in d)(7)c.;

j. the total VOC emissions, in pounds, including startup/shutdown emissions, for emissions units B001-B006, combined;

k. the total $PE/PM_{10}/PM_{2.5}$ emissions, in pounds, including startup/shutdown emissions, for this emissions unit, calculated by multiplying the $PE/ PM_{10}/PM_{2.5}$ emissions factor of 0.005 lb/MMBtu for normal operations and startup and shutdown, 0.019 lb/MMBtu for PE during periods of decoking, and 0.010 lb/MMBtu for $PM_{10}/PM_{2.5}$ emissions during periods of decoking, or the results of the most recent stack test, by the amount of gaseous fuel consumed, including periods of startup/shutdown, as recorded in d)(7)b. and the heat content of the gaseous fuel consumed, as recorded in d)(7)c.;

l. the total $PE/PM_{10}/PM_{2.5}$ emissions, in pounds, including startup/shutdown emissions, for emissions units B001-B006, combined;

m. the total CO_2e emissions, in pounds, including startup/shutdown emissions, for this emissions unit, calculated by multiplying the CO_2e emissions factor of 117.00 lbs/MMBtu, by the amount of gaseous fuel consumed, including periods of startup/shutdown, as recorded in d)(7)b. and the heat content of the gaseous fuel consumed, as recorded in d)(7)c.;

n. the total CO_2e emissions, in pounds, including startup/shutdown emissions, for emissions units B001-B006, combined;

o. the rolling, 12-month summation of the NO_x emissions from emissions units B001-B006, combined, in tons, including start-up/shutdown emissions, calculated by adding the total NO_x emissions for the present month as recorded in d)(7)f., plus the total NO_x emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

p. The rolling, 12-month summation of the CO emissions from emissions units B001-B006, combined, in tons, including startup/shutdown emissions, calculated by adding the total CO emissions for the present month as recorded in d)(7)h., plus the total CO emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

q. The rolling, 12-month summation of the VOC emissions from emissions units B001-B006, combined, in tons, including startup/shutdown emissions, calculated by adding the total VOC emissions for the present month as recorded in d)(7)j., plus the total VOC emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

r. The rolling, 12-month summation of the $PE/PM_{10}/PM_{2.5}$ emissions from emissions units B001-B006, combined, in tons, including startup/shutdown emissions, calculated by adding the total $PE/PM_{10}/PM_{2.5}$ emissions for the present month as recorded in d)(7)l., plus the total $PE/PM_{10}/PM_{2.5}$ emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds; and

s. The rolling, 12-month summation of the CO_2e emissions from emissions units B001-B006, combined, in tons, including startup/shutdown emissions, calculated by adding the total CO_2e emissions for the present month as recorded in d)(7)n., plus the total CO_2e emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds.

(8) The following records must be maintained on site and made available for inspection upon request:

a. the results of all tests, all operating data collected during the tests and the calculations performed to determine compliance with the emissions standards;

b. copies of manufacturer's equipment design specifications necessary to determine compliance with required control efficiencies or outlet emission rates;

c. copies of maintenance procedures and schedules for this emissions unit; and

d. records of any maintenance conducted on this emissions unit.

(9) The permittee shall perform a tune-up of this emissions unit once every five (5) years, at a minimum, as follows:

a. Inspect the burner, as applicable, and clean or replace any components of the burner as necessary. At units where entry into a piece of process equipment or into a storage vessel is required to complete the tune-up inspections, inspections are required only during planned entries into the storage vessel or process equipment;

b. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if applicable;

c. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly;

d. Optimize total emissions of CO consistent with the manufacturer's specification, if available, and with any NO_x requirement to which the emissions unit is subject;

e. Record the concentrations in the effluent stream of CO in parts per million, by volume, and oxygen in volume percent, before and after the adjustments are made. Concentrations may be taken from the CEM data; and

f. Maintain onsite and if requested, submit, a report containing the following information:

i. The concentrations of CO in the effluent stream in parts per million by volume, and oxygen in volume percent, measured at high fire or typical operating load, before and after the tune-up of the furnace; and

ii. A description of any corrective actions taken as part of the tune-up.

(10) The permit-to-install (PTI) application for emissions units B001-B006 was evaluated based on the actual materials and the design parameters of the emissions unit's(s') exhaust system, as specified by the permittee. The "Toxic Air Contaminant Statute", ORC 3704.03(F), was applied to these emissions units for each toxic air contaminant listed in OAC rule 3745-114-01, using data from the permit application; and modeling was performed for each toxic air contaminant emitted at over one ton per year using an air dispersion model such as SCREEN3, AERMOD, or ISCST3, or other Ohio EPA approved model. The predicted 1-hour maximum ground-level concentration results from the approved air dispersion model were compared to the Maximum Acceptable Ground-Level Concentration (MAGLC), calculated as described in the Ohio EPA guidance document entitled "Review of New Sources of Air Toxic Emissions, Option A", as follows:

a. the exposure limit, expressed as a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, for each toxic compound(s) emitted from the emissions unit(s), (as determined from the raw materials processed and/or coatings or other materials applied) has been documented from one of the following sources and in the following order of preference (TLV was and shall be used, if the chemical is listed):

i. threshold limit value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; or

ii. STEL (short term exposure limit) or the ceiling value from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; the STEL or ceiling value is multiplied by 0.737 to convert the 15-minute exposure limit to an equivalent 8-hour TLV.

b. The TLV is divided by ten to adjust the standard from the working population to the general public (TLV/10).

c. This standard is/was then adjusted to account for the duration of the exposure or the operating hours of the emissions unit(s), i.e., "24" hours per day and "7" days per week, from that of 8 hours per day and 5 days per week. The resulting calculation was (and shall be) used to determine the Maximum Acceptable Ground-Level Concentration (MAGLC):

TLV/10 x 8/24 x 5/7 = 4 TLV/XY = MAGLC

d. The following summarizes the results of dispersion modeling for the significant toxic contaminant emitted at 1 or more tons/year:

Toxic Contaminant: ammonia

TLV (mg/m3): 17.413

Maximum Hourly Emission Rate (lbs/hr): 7.30

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m3): 32.32

MAGLC (ug/m3): 414.60

The permittee has demonstrated that emissions of ammonia from emissions units B001-B006, combined, are calculated to be less than eighty percent of the maximum acceptable ground level concentration (MAGLC); any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F).

(11) Prior to making any physical changes to or changes in the method of operation of the emissions unit(s), that could impact the parameters or values that were used in the predicted 1-hour maximum ground-level concentration, the permittee shall re-model the change(s) to demonstrate that the MAGLC has not been exceeded. Changes that can affect the parameters/values used in determining the 1-hour maximum ground-level concentration include, but are not limited to, the following:

a. changes in the composition of the materials used or the use of new materials, that would result in the emission of a new toxic air contaminant with a lower Threshold Limit Value (TLV) than the lowest TLV previously modeled;

b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any toxic air contaminant listed in OAC rule 3745-114-01, that was modeled from the initial (or last) application; and

c. physical changes to the emissions unit(s) or its/their exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Toxic Air Contaminant Statute" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to a non-restrictive change to a parameter or process operation, where compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), has been documented. If the change(s) meet(s) the definition of a "modification", the permittee shall apply for and obtain a final PTI prior to the change. The Director may consider any significant departure from the operations of the emissions unit, described in the permit application, as a modification that results in greater emissions than the emissions rate modeled to determine the ground level concentration; and he/she may require the permittee to submit a permit application for the increased emissions.

(12) The permittee shall collect, record, and retain the following information for each toxic evaluation conducted to determine compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F):

a. a description of the parameters/values used in each compliance demonstration and the parameters or values changed for any re-evaluation of the toxic(s) modeled (the composition of materials, new toxic contaminants emitted, change in stack/exhaust parameters, etc.);

b. the Maximum Acceptable Ground-Level Concentration (MAGLC) for each significant toxic contaminant or worst-case contaminant, calculated in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F);

c. a copy of the computer model run(s), that established the predicted 1-hour maximum ground-level concentration that demonstrated the emissions unit(s) to be in compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), initially and for each change that requires re-evaluation of the toxic air contaminant emissions; and

d. the documentation of the initial evaluation of compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), and documentation of any determination that was conducted to re-evaluate compliance due to a change made to the emissions unit(s) or the materials applied.

(13) The permittee shall maintain a record of any change made to a parameter or value used in the dispersion model, used to demonstrate compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration. The record shall include the date and reason(s) for the change and if the change would increase the ground-level concentration.

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the following:

a. Any record which shows the exhaust gas generated from this emissions unit while operating in decoking mode was not directed back into the furnace firebox to ensure complete combustion;

b. Any record which shows the exhaust gas temperature from the emissions unit stack exceeded 350°F based on a monthly, 12-month rolling average.

c. Any record which shows the sulfur content of the natural gas exceeded exceed 0.005 gr/dscf;

d. Any record which shows the ammonia slip rate exceeded 10 ppmvd at 3% O_2; and

e. All exceedances of the rolling, 12-month NO_x, CO, VOC, PE/PM_{10}/$PM_{2.5}$ and CO_2e emissions limitations.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) The permittee shall comply with the following quarterly reporting requirements for the emissions unit and its continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system):

a. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of NO_x emissions in excess of any applicable limit specified in this permit, 40 CFR Part 60, OAC Chapters 3745-14 and 3745-23, and any other applicable rules or regulations. The report shall document the date, commencement and completion times, duration, and magnitude of each exceedance, as well as the reason (if known) and the corrective actions taken (if any) for each exceedance. Excess emissions shall be reported in units of the applicable standard(s).

b. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR Parts 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of continuous CO_2 or O_2 monitoring system downtime and malfunction while the emissions unit was on line.

c. These quarterly reports shall be submitted by January 30, April 30, July 30, and October 30 of each year and shall include the following:

i. the facility name and address;

ii. the manufacturer and model number of the continuous NO_x and CO_2 or O_2 and other associated monitors;

iii. a description of any change in the equipment that comprises the continuous emission monitoring system (CEMS), including any change to the hardware, changes to the software that may affect CEMS readings, and/or changes in the location of the CEMS sample probe;

iv. the excess emissions report (EER)*, i.e., a summary of any exceedances during the calendar quarter, as specified above;

v. the total NO_x emissions for the calendar quarter (tons);

vi. the total operating time (hours) of the emissions unit;

vii. the total operating time of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) while the emissions unit was in operation;

viii. results and date of quarterly cylinder gas audits;

ix. unless previously submitted, results and date of the relative accuracy test audit(s), including results in units of the applicable standard(s), (during appropriate quarter(s));

x. unless previously submitted, the results of any relative accuracy test audit showing the continuous NO_x and CO_2 or O_2 monitor out-of-control and the compliant results following any corrective actions;

xi. the date, time, and duration of any/each malfunction** of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), emissions unit, and/or control equipment;

xii. the date, time, and duration of any downtime** of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) and/or control equipment while the emissions unit was in operation; and

xiii. the reason (if known) and the corrective actions taken (if any) for each event in (b)(xi) and (xii).

Each report shall address the operations conducted and data obtained during the previous calendar quarter.

* where no excess emissions have occurred, or the continuous monitoring system(s) has/have not been inoperative, repaired, or adjusted during the calendar quarter, such information shall be documented in the EER quarterly report

** each downtime and malfunction event shall be reported regardless if there is an exceedance of any applicable limit

(3) The permittee shall comply with the following quarterly reporting requirements for the emissions unit and its continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system):

a. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of CO emissions in excess of any applicable limit specified in this permit, 40 CFR Part 60, OAC Chapter 3745-21, and any other applicable rules or regulations. The report shall document the date, commencement and completion times, duration, and magnitude of each exceedance, as well as, the reason (if known) and the corrective actions taken (if any) for each exceedance. Excess emissions shall be reported in units of the applicable standard(s).

b. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR Parts 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of continuous CO_2 or O_2 monitoring system downtime and malfunction while the emissions unit was on line.

c. These quarterly reports shall be submitted by January 30, April 30, July 30, and October 30 of each year and shall include the following:

i. the facility name and address;

ii. the manufacturer and model number of the continuous CO and CO_2 or O_2 and other associated monitors;

iii. a description of any change in the equipment that comprises the continuous emission monitoring system (CEMS), including any change to the hardware, changes to the software that may affect CEMS readings, and/or changes in the location of the CEMS sample probe;

iv. the excess emissions report (EER)*, i.e., a summary of any exceedances during the calendar quarter, as specified above;

v. the total CO emissions for the calendar quarter (tons);

vi. the total operating time (hours) of the emissions unit;

vii. the total operating time of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) while the emissions unit was in operation;

viii. results and dates of quarterly cylinder gas audits;

ix. unless previously submitted, results and dates of the relative accuracy test audit(s), including results in units of the applicable standard(s), (during appropriate quarter(s));

x. unless previously submitted, the results of any relative accuracy test audit showing the continuous CO and CO_2 or O_2 monitor out-of-control and the compliant results following any corrective actions;

xi. the date, time, and duration of any/each malfunction** of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), emissions unit, and/or control equipment;

xii. the date, time, and duration of any downtime** of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) and/or control equipment while the emissions unit was in operation; and

xiii. the reason (if known) and the corrective actions taken (if any) for each event in (b)(xi) and (xii).

Each report shall address the operations conducted and data obtained during the previous calendar quarter.

* where no excess emissions have occurred, or the continuous monitoring system(s) has/have not been inoperative, repaired, or adjusted during the calendar quarter, such information shall be documented in the EER quarterly report

** each downtime and malfunction event shall be reported regardless of whether there is an exceedance of any applicable limit

(4) The permittee shall submit annual reports that include any changes to any parameter or value used in the dispersion model used to demonstrate compliance with the "Toxic Air Contaminate Statute", ORC 3704.03(F), through the predicted 1-hour maximum concentration. The report should include:

a. the original model input;

b. the updated model input;

c. the reason for the change(s) to the input parameter(s); and

d. a summary of the results of the updated modeling, including the input changes; and

e. a statement that the model results indicate that the 1-hour maximum ground-level concentration is less than 80% of the MAGLC.

If no changes to the emissions, emissions units, or the exhaust stacks have been made during the reporting period, then the report shall include a statement to that effect. This

report shall be postmarked or delivered no later than January 31 following the end of each calendar year.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

NO_x emissions shall not exceed 0.010 lb/MMBtu as a rolling, 12-month average, excluding periods of startup, shutdown and hot steam standby.

NO_x emissions shall not exceed 0.0135 lb/MMBtu as an hourly maximum during normal operation and 7.45 lbs/hr, excluding periods of startup, shutdown and hot steam standby.

NO_x emissions shall not exceed 0.015 lb/MMBtu as a 3-hour average and 2.18 lbs/hr during decoking.

NO_x emissions shall not exceed 0.050 lb/MMBtu as a three-hour average and 27.60 lbs/hr during periods of startup, shutdown and hot steam standby.

Applicable Compliance Method:

Compliance during normal operation shall be demonstrated based upon the data collected by the NO_x CEMS pursuant to the monitoring and recordkeeping requirements specified in d)(2). Compliance during decoking and startup/shutdown shall be demonstrated by the testing required in f)(4).

b. Emissions Limitations:

CO emissions shall not exceed 0.035 lb/MMBtu as a 12-month rolling average and 19.32 lbs/hr.

CO emissions shall not exceed 5.08 lbs/hr during decoking.

Applicable Compliance Method:

Compliance shall be demonstrated based upon the CO CEMS pursuant to the monitoring and recordkeeping requirements specified in d)(4).

c. Emissions Limitations:

VOC emissions shall not exceed 0.008 lb/MMBtu and 4.42 lbs/hr.

Applicable Compliance Method:

Compliance with these emissions limitations shall be demonstrated by the testing required in f)(4).

d. Emissions Limitations:

PE shall not exceed 0.005 lb/MMBtu and 2.76 lbs/hr, excluding periods of decoking.

PE shall not exceed 0.019 lb/MMBtu and 2.76 lbs/hr during decoking.

PM_{10} and $PM_{2.5}$ emissions shall not exceed 0.005 lb/MMBtu and 2.76 lbs/hr, excluding periods of decoking.

PM_{10} and $PM_{2.5}$ emissions shall not exceed 0.010 lb/MMBtu and 1.45 lbs/hr during decoking.

Applicable Compliance Method:

Compliance with these emissions limitations shall be demonstrated by the testing required in f)(4).

e. Emissions Limitations:

Emissions from emissions units B001-B006, combined, shall not exceed:

144.00 tons of NOx per rolling, 12-month period.

500.00 tons of CO per rolling, 12-month period.

114.00 tons of VOC per rolling, 12-month period.

72.59 tons of PE per rolling, 12-month period.

71.89 tons of PM_{10} and $PM_{2.5}$ per rolling, 12-month period.

1,673,240 tons of $CO2_e$ per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the rolling, 12-month emissions limitations shall be demonstrated by the recordkeeping in d)(7).

f. Emissions Limitation:

Visible PE from any stack shall not exceed 20 percent opacity, except as provided by the rule.

Applicable Compliance Method:

Compliance with this emissions limitation shall be demonstrated by the testing required in f)(4).

(2) Within 60 days of achieving the maximum production rate at which the emissions unit(s) will be operated, but not later than 180 days after initial startup, the permittee shall conduct certification tests of the continuous NO_x monitoring system (including the

associated continuous CO_2 or O_2 monitoring system) in units of the applicable standard(s), to demonstrate compliance with 40 CFR Part 60, Appendix B, Performance Specifications 2, 3 and 6; and ORC section 3704.03(I).

Personnel from the Ohio EPA Central Office and the appropriate Ohio EPA District Office or local air agency shall be notified 30 days prior to initiation of the applicable tests and shall be permitted to examine equipment and witness the certification tests. Two copies of the test results shall be submitted to Ohio EPA, one copy to the appropriate Ohio EPA District Office or local air agency and one copy to Ohio EPA Central Office, and pursuant to OAC rule 3745-15-04, within 30 days after the test is completed.

Certification of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be granted upon determination by the Ohio EPA, Central Office that the system meets the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 2, 3 and 6; and ORC section 3704.03(I).

Ongoing compliance with the NO_x emissions limitations contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the Monitoring and Record keeping Section of this permit; and through demonstration of compliance with the quality assurance/quality control plan, which shall meet the testing and recertification requirements of 40 CFR Part 60.

Ongoing compliance with the CO_2 or O_2 monitoring requirements contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the monitoring and record keeping section of this permit; and demonstration of compliance with the quality assurance/quality control plan, which shall meet the testing and recertification requirements of 40 CFR Part 60.

(3) Within 60 days of achieving the maximum production rate at which the emissions unit(s) will be operated, but not later than 180 days after initial startup, the permittee shall conduct certification tests of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) in units of the applicable standard(s), to demonstrate compliance with 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4 or 4a (as appropriate) and 6; and ORC section 3704.03(I).

Personnel from the Ohio EPA Central Office and the appropriate Ohio EPA District Office or local air agency shall be notified 30 days prior to initiation of the applicable tests and shall be permitted to examine equipment and witness the certification tests. Two copies of the test results shall be submitted to Ohio EPA, one copy to the appropriate Ohio EPA District Office or local air agency and one copy to Ohio EPA Central Office, and pursuant to OAC rule 3745-15-04, within 30 days after the test is completed.

Certification of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be granted upon determination by the Ohio EPA Central Office that the system meets the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4 or 4a (as appropriate) and 6 and ORC section 3704.03(I).

Ongoing compliance with the CO emission limitations contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the Monitoring and Record keeping Section of this permit; and through demonstration of compliance with the quality assurance/quality control plan, which shall meet the requirements of 40 CFR Part 60.

Ongoing compliance with the CO_2 or O_2 monitoring requirements contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the monitoring and record keeping section of this permit; and demonstration of compliance with the quality assurance/quality control plan, which shall meet the testing and recertification requirements of 40 CFR Part 60.

(4) Performance testing shall be conducted as required in OAC rules 3745-31-10 through 20. The permittee shall conduct, or have conducted, emission testing for this emissions unit within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, as applicable, in accordance with the following requirements:

a. The emission testing shall be conducted to demonstrate compliance with the emissions limitations specified in b)(1) for VOC, PE/PM_{10}/$PM_{2.5}$, visible PE, and NO_x.

b. The following test method(s) shall be employed to demonstrate compliance with the allowable mass emission rate(s):

for VOC, Methods 1-4 and 18 and 25 of 40 CFR Part 60 Appendix A;

for PE/PM_{10}/$PM_{2.5}$, Methods 1-5 and 202 of 40 CFR Part 60 Appendix A;

for visible PE, Method 9 of 40 CFR Part 60 Appendix A; and

for NO_x, Methods 1-4 and 7E of 40 CFR Part 60 Appendix A.

Alternative U.S. EPA-approved test methods may be used with prior approval from the Ohio EPA.

c. The test(s) for each pollutant shall be conducted while the emissions unit is operating at or near its maximum capacity, while burning representative fuel and/or combination of fuels, unless otherwise specified or approved by the Ohio EPA, Southeast District Office.

d. The testing for VOC, PE/PM_{10}/$PM_{2.5}$ and visible PE shall be conducted when the emissions unit is operating in normal mode. Testing for PE/PM_{10}/$PM_{2.5}$ shall also be conducted when the emissions unit is operating in decoking mode. Testing for NO_x shall only be conducted when the emissions unit is operating in decoking or startup/shutdown modes.

e. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the Ohio EPA, Southeast District Office. The "Intent to Test" notification shall describe in detail the proposed test methods

and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA, Southeast District Office's refusal to accept the results of the emission test(s).

f. Personnel from the Ohio EPA, Southeast District Office shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

g. A comprehensive written report on the results of the emission test(s) shall be signed by the person or persons responsible for the tests and submitted to the Ohio EPA, Southeast District Office within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the Ohio EPA, Southeast District Office.

g) Miscellaneous Requirements

(1) None.

2. Emissions Unit Group - Natural Gas and Ethane-Fired Steam Boilers: B007 - B009

EU ID	Operations, Property and/or Equipment Description
B007	Steam Boiler 1 (5PK-5801); natural gas and ethane-fired steam boiler equipped with ultra-low-NO_x burners and flue gas recirculation (FGR) with a maximum fuel input rating of 400 million BTU/hour and an average fuel input rating of 160 MMBtu/hour
B008	Steam Boiler 2 (5PK-5802); natural gas and ethane-fired steam boiler equipped with ultra-low-NO_x burners and FGR with a maximum fuel input rating of 400 million BTU/hour and an average fuel input rating of 160 MMBtu/hour
B009	Steam Boiler 3 (5PK-5803); natural gas and ethane-fired steam boiler equipped with ultra-low-NO_x burners and FGR with a maximum fuel input rating of 400 million BTU/hour and an average fuel input rating of 160 MMBtu/hour

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)d. and b)(2)g.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Nitrogen oxides (NO_x) emissions shall not exceed 0.010 lb/MMBtu of actual heat input as a rolling, 30-day average and 4.00 lbs/hr, excluding periods of startup and shutdown. NO_x emissions shall not exceed 0.020 lb/MMBtu of actual heat input and 8.00 lbs/hr during periods of startup and shutdown. Carbon monoxide (CO) emissions shall not exceed 0.035 lb/MMBtu of actual heat input as a rolling, 12-month average and 14.00 lbs/hr. Volatile organic compound (VOC) emissions shall not exceed 0.0054 lb/MMBtu of actual heat input and 2.16 lbs/hr.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		Particulate emissions (PE) and emissions of particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) shall not exceed 0.005 lb/MMBtu of actual heat input and 2.00 lbs/hr. Emissions from emissions units B007-B009, combined, shall not exceed: 8.76 tons of NO_x per rolling, 12-month period; 30.70 tons of CO per rolling, 12-month period; 4.73 tons of VOC per rolling, 12-month period; 4.38 tons of $PE/PM_{10}/PM_{2.5}$ per rolling, 12-month period; and 102,500 tons of carbon dioxide equivalents (CO_2e) per rolling, 12-month period. The requirements of this rule include compliance with OAC rule 3745-17-07(A). See b)(2)a.-e. below.
b.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	The requirements of this rule are equivalent to the requirements of OAC rules 3745-31-10 through 3745-31-20 for CO emissions. Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the CO_2e emissions from this air contaminant source pursuant to OAC rule 3745-31-34(E)(8).
c.	OAC rule 3745-31-05(A)(3), as effective 6/30/08	The requirements of this rule are equivalent to the requirements of OAC rules 3745-31-10 through 3745-31-20 for NO_x, VOC and $PE/PM_{10}/PM_{2.5}$ emissions. See b)(2)f. and c)(1) below.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
d.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective 6/30/08	BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the NO_x, VOC and PE/PM_{10}/$PM_{2.5}$ emissions from this air contaminant source since the calculate annual emissions rate is less than 10 tons/yr taking into account the federally enforceable rule limitations applicable pursuant to OAC rules 3745-31-10 through 3745-31-20. BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the SO_2 emissions from this air contaminant source since the potential to emit is less than 10 tons/year. See b)(2)g. below.
e.	OAC rule 3745-17-10(B)(1)	The emissions limitation required by this rule is less stringent than the emission limitation required pursuant to OAC rules 3745-31-10 through 3745-31-20.
f.	OAC rule 3745-17-07(A)	Visible PE from the stack shall not exceed twenty percent opacity, as a six-minute average, except as provided by the rule.
g.	OAC rule 3745-18-06	Exempt pursuant to OAC rule 3745-18-06(A) since only natural gas fuel is burned in this emissions unit.
h.	OAC rule 3745-110-03(C)	Exempt pursuant to OAC rule 3745-110-03(K)(20) because this emissions unit is subject to BACT requirements for NO_x emissions.
i.	40 CFR Part 60, Subparts A and Db (60.1-19 and 60.40b–60.49b) [In accordance with 40 CFR 60.40b(a), this emissions unit is a steam generating unit commencing construction, modification or reconstruction after July 19, 1984 and that has a heat input capacity of greater than 29 megawatts (MW) (100 million BTU per hour (MMBtu/hr) subject to the emissions limitations and control measures specified in this section.]	The emissions limitations required by this rule are less stringent than the emissions limitations required pursuant to OAC rules 3745-31-10 through 3745-31-20 for NO_x emissions. [40 CFR 60.44b(a)(1)] Emissions units firing only gaseous fuels are exempt from the SO_2 emissions limitation in 60.42b(k)(1). [40 CFR 60.42b(k)(2)] See b)(2)k. below.
j.	40 CFR Part 63, Subpart DDDDD	The permittee shall comply with the work

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	(40 CFR 63.7480-7575) [In accordance with 40 CFR 63.7480, 63.7485, 63.7490(a)(2) and (b) and 63.7499(l), this emissions unit is a new industrial boiler located at a major source of HAP emissions in the units designed to burn gas 1 fuels subject to the emissions limitations and control measures specified in this section.]	practice standards in 40 CFR Part 63, Subpart DDDDD Table 3. [40 CFR 63.7500(a)(1) and (e) and Table 3 (1 or 3)] See c)(3) below. The permittee shall comply with the requirements of 40 CFR Part 63, Subpart DDDDD upon startup. [40 CFR 63.7495(a)]
k.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	Table 10 of 40 CFR Part 63, Subpart DDDDD specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart. [40 CFR 63.7565]

(2) Additional Terms and Conditions

a. As part of the Best Available Control Technology (BACT) determination for NO_x, each boiler must be equipped with low-NOx burners (capable of achieving the lowest NO_x emission rate achievable by the technology available at the time of construction) and must utilize FGR. Compliance with these requirements shall be demonstrated by compliance with the short-term NO_x emission limitations in b)(1)a.

b. As part of the BACT determination for CO, compliance with the BACT requirements shall be demonstrated by compliance with the short-term CO emission limitations in b)(1)a.

c. As part of the BACT determination for VOC, compliance with the BACT requirements shall be demonstrated by compliance with the short-term VOC emission limitation in b)(1)a.

d. As part of the BACT determination for PE, PM_{10} and $PM_{2.5}$, compliance with the BACT requirements shall be demonstrated by compliance with the short-term PE, PM_{10} and $PM_{2.5}$ emission limitations in b)(1)a.

e. As part of the BACT determination for CO_2e, compliance with the BACT requirements shall be demonstrated by compliance with the CO_2e emissions limitation in b)(1)a.

f. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

g. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

h. Continuous emission monitoring systems consist of all the equipment used to acquire data to provide a record of emissions and includes the sample extraction and transport hardware, sample conditioning hardware, analyzers, and data recording/processing hardware and software.

i. Each continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be certified to meet the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 2, 3 and 6. At least 45 days before commencing certification testing of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall develop and maintain a written quality assurance/quality control plan designed to ensure continuous valid and representative readings of NO_x and CO_2 or O_2 emissions from the continuous monitor(s), in units of the applicable standard(s). The plan shall follow the requirements of 40 CFR Part 60, Appendix F. The quality assurance/quality control plan and a logbook dedicated to the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) must be kept on site and available for inspection during regular office hours.

The plan shall include the requirement to conduct quarterly cylinder gas audits or relative accuracy audits as required in 40 CFR Part 60; and to conduct relative accuracy test audits in units of the standard(s), in accordance with and at the frequencies required per 40 CFR Part 60.

j. Each continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be certified to meet the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 3, 4 or 4a and 6. At least 45 days before commencing certification testing of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall develop and maintain a written quality assurance/quality control plan designed to ensure continuous valid and representative readings of CO and CO_2 or O_2 emissions from the continuous monitor(s), in units of the applicable standard(s). The plan shall follow the requirements of 40 CFR Part 60, Appendix F. The quality assurance/quality control plan and a logbook dedicated to the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) must be kept on site and available for inspection during regular office hours.

The plan shall include the requirement to conduct quarterly cylinder gas audits or relative accuracy audits as required in 40 CFR Part 60; and to conduct relative accuracy test audits in units of the standard(s), in accordance with and at the frequencies required per 40 CFR Part 60.

k. See 40 CFR Part 60, Subpart Db (40 CFR 60.40b–60.49b).

c) Operational Restrictions

(1) The permittee shall burn only natural gas or ethane fuel with a maximum sulfur content not to exceed 0.005 gr/dscf in this emissions unit.

(2) See 40 CFR Part 60, Subpart Db (40 CFR 60.40b–60.49b).

(3) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480-7575).

d) Monitoring and/or Recordkeeping Requirements

(1) For each day during which the permittee burns a fuel other than natural gas or ethane fuel with a maximum sulfur content of 0.005 gr/dscf, the permittee shall maintain a record of the type and quantity of fuel burned in this emissions unit.

(2) Prior to the installation of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall submit information detailing the proposed location of the sampling site in accordance with the siting requirements in 40 CFR Part 60, Appendix B, Performance Specifications 2 and 3. The Ohio EPA, Central Office shall approve the proposed sampling site and certify that the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) meets the requirements of Performance Specifications 2, 3 and 6. Once received, the letter(s)/document(s) of certification shall be maintained on-site and shall be made available to the Director (the appropriate Ohio EPA District Office or local air agency) upon request.

(3) The permittee shall install, operate, and maintain equipment to continuously monitor and record NO_x and CO_2 or O_2 emissions from this emissions unit in units of the applicable standard(s). The continuous monitoring and recording equipment shall comply with the requirements specified in 40 CFR Part 60.

The permittee shall maintain records of all data obtained by the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) including, but not limited to:

a. emissions of NO_x in parts per million for each cycle time of the analyzer, with no resolution less than one data point per minute required;

b. emissions of NO_x in pounds per month;

c. the percent CO_2 or O_2 with each cycle time of the analyzer, with no resolution less than one data point per minute required;

d. results of quarterly cylinder gas audits;

e. results of daily zero/span calibration checks and the magnitude of manual calibration adjustments;

f. results of required relative accuracy test audit(s), including results in units of the applicable standard(s);

g. hours of operation of the emissions unit, continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), and control equipment;

h. the date, time, and hours of operation of the emissions unit without the control equipment and/or the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system);

i. the date, time, and hours of operation of the emissions unit during any malfunction of the control equipment and/or the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system); as well as,

j. the reason (if known) and the corrective actions taken (if any) for each such event in (h) and (i).

All valid data points generated and recorded by the continuous emission monitoring and data acquisition and handling system shall be used in the calculation of the pollutant concentration and/or emission rate over the appropriate averaging period.

(4) Prior to the installation of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), the permittee shall submit information detailing the proposed location of the sampling site in accordance with the siting requirements in 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4 or 4a (as appropriate). The Ohio EPA, Central Office shall approve the proposed sampling site and certify that the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) meets the requirements of Performance Specifications 2, 4 or 4a and 6. Once received, the letter(s)/document(s) of certification shall be maintained on-site and shall be made available to the Director (the appropriate Ohio EPA District Office or local air agency) upon request.

(5) The permittee shall operate and maintain equipment to continuously monitor and record CO and CO_2 or O_2 emissions from this emissions unit in units of the applicable standard(s). The continuous monitoring and recording equipment shall comply with the requirements specified in 40 CFR Part 60.

The permittee shall maintain records of all data obtained by the continuous CO monitoring system including, but not limited to:

a. emissions of CO in parts per million for each cycle time of the analyzer, with no resolution less than one data point per minute required;

b. emissions of CO in pounds per month;

c. the percent CO_2 or O_2 with each cycle time of the analyzer, with no resolution less than one data point per minute required;

d. results of quarterly cylinder gas audits;

e. results of daily zero/span calibration checks and the magnitude of manual calibration adjustments;

f. results of required relative accuracy test audit(s), including results in units of the applicable standard(s);

g. hours of operation of the emissions unit, continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), and control equipment;

h. the date, time, and hours of operation of the emissions unit without the control equipment and/or the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system);

i. the date, time, and hours of operation of the emissions unit during any malfunction of the control equipment and/or the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system); as well as,

j. the reason (if known) and the corrective actions taken (if any) for each such event in (h) and (i).

All valid data points generated and recorded by the continuous emission monitoring and data acquisition and handling system shall be used in the calculation of the pollutant concentration and/or emission rate over the appropriate averaging period.

(6) In order to accurately determine the heat input rates for this emissions unit, the permittee shall install, operate, and maintain equipment to continuously monitor and record the actual natural gas fuel flow rate to this emissions unit.

(7) The permittee shall maintain monthly records of the following information:

a. the amount of natural gas and ethane consumed in this emissions unit, in MMscf;

b. the heat content of the natural gas and ethane combusted in this emissions unit, in MMBtu/MMscf;

c. the sulfur content of the natural gas and ethane combusted in this emissions unit, in gr/dscf;

d. the total NO_x emissions for this emissions unit, in pounds, as recorded in d)(3)b.;

e. the total NOx emissions, in pounds, including startup/shutdown emissions, for emissions units B007-B009, combined;

f. the total CO emissions, in pounds, as recorded in d)(5)b.;

g. the total CO emissions, in pounds, including startup/shutdown emissions, for emissions units B007-B009, combined;

h. the total VOC emissions, in pounds, including startup/shutdown emissions, for this emissions unit, calculated by multiplying the VOC emissions factor of 0.0054 lb/MMBtu, or the results of the most recent stack test, by the amount of natural gas and ethane consumed, including periods of startup/shutdown, as recorded in d)(7)a. and the heat content of the natural gas consumed, as recorded in d)(7)b.;

i. the total VOC emissions, in pounds, including startup/shutdown emissions, for emissions units B007-B009, combined;

j. the total $PE/PM_{10}/PM_{2.5}$ emissions, in pounds, including startup/shutdown emissions, for this emissions unit, calculated by multiplying the $PE/PM_{10}/PM_{2.5}$ emissions factor of 0.005 lb/MMBtu, or the results of the most recent stack test, by the amount of natural gas and ethane consumed, including periods of startup/shutdown, as recorded in d)(7)a. and the heat content of the natural gas consumed, as recorded in d)(7)b.;

k. the total $PE/PM_{10}/PM_{2.5}$ emissions, in pounds, including startup/shutdown emissions, for emissions units B007-B009, combined;

l. the total CO_2e emissions, in pounds, including startup/shutdown emissions, for this emissions unit, calculated by multiplying the CO_2e emissions factor of 117.00 lbs/MMBtu, by the amount of natural gas and ethane consumed, including periods of startup/shutdown, as recorded in d)(7)a. and the heat content of the natural gas consumed, as recorded in d)(7)b.;

m. the total CO_2e emissions, in pounds, including startup/shutdown emissions, for emissions units B007-B009, combined;

n. the rolling, 12-month summation of the NO_x emissions from emissions units B007-B009, combined, in tons, including start-up/shutdown emissions, calculated by adding the total NO_x emissions for the present month as recorded in d)(7)e., plus the total NO_x emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

o. The rolling, 12-month summation of the CO emissions from emissions units B007-B009, combined, in tons, including startup/shutdown emissions, calculated by adding the total CO emissions for the present month as recorded in d)(7)g., plus the total CO emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

p. The rolling, 12-month summation of the VOC emissions from emissions units B007-B009, combined, in tons, including startup/shutdown emissions, calculated by adding the total VOC emissions for the present month as recorded in d)(7)i., plus the total VOC emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

q. The rolling, 12-month summation of the $PE/PM_{10}/PM_{2.5}$ emissions from emissions units B007-B009, combined, in tons, including startup/shutdown emissions, calculated by adding the total $PE/PM_{10}/PM_{2.5}$ emissions for the present month as

recorded in d)(7)k., plus the total $PE/PM_{10}/PM_{2.5}$ emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds; and

r. The rolling, 12-month summation of the CO_2e emissions from emissions units B007-B009, combined, in tons, including startup/shutdown emissions, calculated by adding the total CO_2e emissions for the present month as recorded in d)(7)m., plus the total CO_2e emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds.

(8) See 40 CFR Part 60, Subpart Db (40 CFR 60.40b–60.49b).

(9) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480-7575).

e) Reporting Requirements

(1) The permittee shall submit deviation (excursion) reports that identify each day when a fuel other than natural gas or ethane with a maximum sulfur content of 0.005 gr/dscf was burned in this emissions unit. Each report shall be submitted within 30 days after the deviation occurs.

(2) The permittee shall submit quarterly deviation (excursion) reports that identify all exceedances of the rolling, 12-month NO_x, CO, VOC, $PE/PM_{10}/PM_{2.5}$ and CO_2e emissions limitations. The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(3) The permittee shall comply with the following quarterly reporting requirements for the emissions unit and its continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system):

a. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of NO_x emissions in excess of any applicable limit specified in this permit, 40 CFR Part 60, OAC Chapters 3745-14 and 3745-23, and any other applicable rules or regulations. The report shall document the date, commencement and completion times, duration, and magnitude of each exceedance, as well as the reason (if known) and the corrective actions taken (if any) for each exceedance. Excess emissions shall be reported in units of the applicable standard(s).

b. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR Parts 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of continuous CO_2 or O_2 monitoring system downtime and malfunction while the emissions unit was on line.

c. These quarterly reports shall be submitted by January 30, April 30, July 30, and October 30 of each year and shall include the following:

i. the facility name and address;

ii. the manufacturer and model number of the continuous NO_x and CO_2 or O_2 and other associated monitors;

iii. a description of any change in the equipment that comprises the continuous emission monitoring system (CEMS), including any change to the hardware, changes to the software that may affect CEMS readings, and/or changes in the location of the CEMS sample probe;

iv. the excess emissions report (EER)*, i.e., a summary of any exceedances during the calendar quarter, as specified above;

v. the total NO_x emissions for the calendar quarter (tons);

vi. the total operating time (hours) of the emissions unit;

vii. the total operating time of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) while the emissions unit was in operation;

viii. results and date of quarterly cylinder gas audits;

ix. unless previously submitted, results and date of the relative accuracy test audit(s), including results in units of the applicable standard(s), (during appropriate quarter(s));

x. unless previously submitted, the results of any relative accuracy test audit showing the continuous NO_x and CO_2 or O_2 monitor out-of-control and the compliant results following any corrective actions;

xi. the date, time, and duration of any/each malfunction** of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system), emissions unit, and/or control equipment;

xii. the date, time, and duration of any downtime** of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) and/or control equipment while the emissions unit was in operation; and

xiii. the reason (if known) and the corrective actions taken (if any) for each event in (b)(xi) and (xii).

Each report shall address the operations conducted and data obtained during the previous calendar quarter.

* where no excess emissions have occurred, or the continuous monitoring system(s) has/have not been inoperative, repaired, or adjusted during the calendar quarter, such information shall be documented in the EER quarterly report

** each downtime and malfunction event shall be reported regardless if there is an exceedance of any applicable limit

(4) The permittee shall comply with the following quarterly reporting requirements for the emissions unit and its continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system):

a. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of CO emissions in excess of any applicable limit specified in this permit, 40 CFR Part 60, OAC Chapter 3745-21, and any other applicable rules or regulations. The report shall document the date, commencement and completion times, duration, and magnitude of each exceedance, as well as, the reason (if known) and the corrective actions taken (if any) for each exceedance. Excess emissions shall be reported in units of the applicable standard(s).

b. Pursuant to the monitoring, record keeping, and reporting requirements for continuous monitoring systems contained in 40 CFR Parts 60.7 and 60.13(h) and the requirements established in this permit, the permittee shall submit reports within 30 days following the end of each calendar quarter to the appropriate Ohio EPA District Office or local air agency, documenting all instances of continuous CO_2 or O_2 monitoring system downtime and malfunction while the emissions unit was on line.

c. These quarterly reports shall be submitted by January 30, April 30, July 30, and October 30 of each year and shall include the following:

i. the facility name and address;

ii. the manufacturer and model number of the continuous CO and CO_2 or O_2 and other associated monitors;

iii. a description of any change in the equipment that comprises the continuous emission monitoring system (CEMS), including any change to the hardware, changes to the software that may affect CEMS readings, and/or changes in the location of the CEMS sample probe;

iv. the excess emissions report (EER)*, i.e., a summary of any exceedances during the calendar quarter, as specified above;

v. the total CO emissions for the calendar quarter (tons);

vi. the total operating time (hours) of the emissions unit;

vii. the total operating time of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) while the emissions unit was in operation;

viii. results and dates of quarterly cylinder gas audits;

ix. unless previously submitted, results and dates of the relative accuracy test audit(s), including results in units of the applicable standard(s), (during appropriate quarter(s));

x. unless previously submitted, the results of any relative accuracy test audit showing the continuous CO and CO_2 or O_2 monitor out-of-control and the compliant results following any corrective actions;

xi. the date, time, and duration of any/each malfunction** of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system), emissions unit, and/or control equipment;

xii. the date, time, and duration of any downtime** of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) and/or control equipment while the emissions unit was in operation; and

xiii. the reason (if known) and the corrective actions taken (if any) for each event in (b)(xi) and (xii).

Each report shall address the operations conducted and data obtained during the previous calendar quarter.

* where no excess emissions have occurred, or the continuous monitoring system(s) has/have not been inoperative, repaired, or adjusted during the calendar quarter, such information shall be documented in the EER quarterly report

** each downtime and malfunction event shall be reported regardless of whether there is an exceedance of any applicable limit

(5) See 40 CFR Part 60, Subpart Db (40 CFR 60.40b–60.49b).

(6) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480-7575).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

NO_x emissions shall not exceed 0.010 lb/MMBtu of actual heat input as a rolling, 30-day average and 4.00 lbs/hr, excluding periods of startup and shutdown.

NO_x emissions shall not exceed 0.020 lb/MMBtu of actual heat input and 8.00 lbs/hr during periods of startup and shutdown.

Applicable Compliance Method:

Initial and continuing compliance with short-term emissions limitations shall be demonstrated based upon the NO_x CEMS monitoring and recordkeeping requirements specified in d)(3).

b. Emissions Limitations:

CO emissions shall not exceed 0.035 lb/MMBtu of actual heat input as a rolling, 12-month average and 14.00 lbs/hr.

Applicable Compliance Method:

Initial and continuing compliance with short-term emissions limitations shall be demonstrated based upon the CO CEMS monitoring and recordkeeping requirements specified in d)(5).

c. Emissions Limitations:

VOC emissions shall not exceed 0.0054 lb/MMBtu of actual heat input and 2.16 lbs/hr.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be demonstrated based on the testing requirements in f)(4).

d. Emissions Limitations:

PE and emissions of PM_{10} and $PM_{2.5}$ shall not exceed 0.005 lb/MMBtu of actual heat input and 2.00 lbs/hr.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be demonstrated based on the testing requirements in f)(4).

e. Emissions Limitations:

Emissions from emissions units B007-B009, combined, shall not exceed:

8.76 tons of NO_x per rolling, 12-month period;

30.70 tons of CO per rolling, 12-month period;

4.73 tons of VOC per rolling, 12-month period;

4.38 tons of PE/PM_{10}/$PM_{2.5}$ per rolling, 12-month period; and

102,500 tons of CO_2e per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the rolling, 12-month emissions limitations shall be demonstrated by the recordkeeping in d)(7).

f. Emissions Limitations:

Visible PE from the stack shall not exceed twenty percent opacity, as a six-minute average, except as provided by the rule.

Applicable Compliance Method:

Compliance with the opacity limitation shall be demonstrated based on the testing requirements in f)(4).

(2) Within 60 days of achieving the maximum production rate at which the emissions unit(s) will be operated, but not later than 180 days after initial startup, the permittee shall conduct certification tests of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) in units of the applicable standard(s), to demonstrate compliance with 40 CFR Part 60, Appendix B, Performance Specifications 2 and 3.

Personnel from the Ohio EPA Central Office and the appropriate Ohio EPA District Office or local air agency shall be notified 30 days prior to initiation of the applicable tests and shall be permitted to examine equipment and witness the certification tests. Two copies of the test results shall be submitted to Ohio EPA, one copy to the appropriate Ohio EPA District Office or local air agency and one copy to Ohio EPA Central Office and pursuant to OAC rule 3745-15-04, within 30 days after the test is completed.

Certification of the continuous NO_x monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be granted upon determination by the Ohio EPA, Central Office that the system meets the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 2 and 3 and ORC Section 3704.03(I).

Ongoing compliance with the NO_x emissions limitations shall be demonstrated through the data collected as required in the monitoring and recordkeeping section of this permit; and through demonstration of compliance with the quality assurance/quality control plan, which shall meet the testing and recertification requirements of 40 CFR Part 60.

Ongoing compliance with the CO_2 or O_2 monitoring requirements contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the monitoring and record keeping section of this permit; and demonstration of compliance with the quality assurance/quality control plan, which shall meet the testing and recertification requirements of 40 CFR Part 60.

(3) Within 60 days of achieving the maximum production rate at which the emissions unit(s) will be operated, but not later than 180 days after initial startup, the permittee shall

conduct certification tests of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) in units of the applicable standard(s), to demonstrate compliance with 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4 or 4a (as appropriate) and 6; and ORC section 3704.03(I).

Personnel from the Ohio EPA Central Office and the appropriate Ohio EPA District Office or local air agency shall be notified 30 days prior to initiation of the applicable tests and shall be permitted to examine equipment and witness the certification tests. Two copies of the test results shall be submitted to Ohio EPA, one copy to the appropriate Ohio EPA District Office or local air agency and one copy to Ohio EPA Central Office, and pursuant to OAC rule 3745-15-04, within 30 days after the test is completed.

Certification of the continuous CO monitoring system (including the associated continuous CO_2 or O_2 monitoring system) shall be granted upon determination by the Ohio EPA Central Office that the system meets the requirements of 40 CFR Part 60, Appendix B, Performance Specifications 3 and 4 or 4a (as appropriate) and 6 and ORC section 3704.03(I).

Ongoing compliance with the CO emission limitations contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the Monitoring and Record keeping Section of this permit; and through demonstration of compliance with the quality assurance/quality control plan, which shall meet the requirements of 40 CFR Part 60.

Ongoing compliance with the CO_2 or O_2 monitoring requirements contained in this permit, 40 CFR Part 60, and any other applicable standard(s) shall be demonstrated through the data collected as required in the monitoring and record keeping section of this permit; and demonstration of compliance with the quality assurance/quality control plan, which shall meet the testing and recertification requirements of 40 CFR Part 60.

(4) Performance testing shall be conducted as required in OAC rules 3745-31-10 through 20. The permittee shall conduct, or have conducted, emission testing for this emissions unit within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, as applicable, in accordance with the following requirements:

a. The emission testing shall be conducted to demonstrate compliance with the emissions limitations specified in b)(1) for VOC, PE/PM_{10}/$PM_{2.5}$ and visible PE.

b. The following test method(s) shall be employed to demonstrate compliance with the allowable mass emission rate(s):

for VOC, Methods 1-4 and 18 and 25 of 40 CFR Part 60 Appendix A;

for PE/PM_{10}/$PM_{2.5}$, Methods 1-5 and 202 of 40 CFR Part 60 Appendix A; and

for visible PE, Method 9 of 40 CFR Part 60 Appendix A.

Alternative U.S. EPA-approved test methods may be used with prior approval from the Ohio EPA.

c. The test(s) for each pollutant shall be conducted while the emissions unit is operating at or near its maximum capacity, while burning representative fuel and/or combination of fuels, unless otherwise specified or approved by the Ohio EPA, Southeast District Office.

d. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the Ohio EPA, Southeast District Office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA, Southeast District Office's refusal to accept the results of the emission test(s).

e. Personnel from the Ohio EPA, Southeast District Office shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

f. A comprehensive written report on the results of the emission test(s) shall be signed by the person or persons responsible for the tests and submitted to the Ohio EPA, Southeast District Office within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the Ohio EPA, Southeast District Office.

g) Miscellaneous Requirements

(1) None.

3. P801, Ethylene Manufacturing Unit

Operations, Property and/or Equipment Description:

1,500 KTA ethylene manufacturing process; includes feed preheating, cracking, quenching, compression, caustic scrubbing, precooling/drying, separation, and hydrogenation. Process vents, storage tanks, and startup/shutdown/maintenance/upsets controlled by flare and thermal oxidizer.

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) None.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC) – see b)(2)a.i. BACT for and carbon dioxide equivalents (CO_2e) – see b)(2)a.ii.
b.	ORC 3704.03(T)	Best Available Technology (BAT) for VOC See b)(2)b.
c.	OAC rule 3745-21-09(DD)	See b)(2)c.
	40 CFR Part 60, Subpart Kb (40 CFR Part 60.110b – 60.117b) This emissions unit contains storage vessels with a capacity > 75 m3 used to store volatile organic liquids (VOL) subject to the requirements specified in this section]	Maintain records [40 CFR, Part 60.116b(c)] See b)(2)e. and b)(2)f.
d.	40 CFR Part 60, Subpart VVa (40 CFR Part 60.480a – 60.489a) [In accordance with 40 CFR 60.480a, this emissions unit involves equipment in synthetic organic chemicals manufacturing subject to the requirements specified	Leak detection and repair for equipment within a process unit that produces chemicals listed in §60.489a [40 CFR 60.482-1a through 60.482-11a] See b)(2)c.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	in this section.]	
e.	40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668) [In accordance with 40 CFR 60.660(b)(2), this emissions unit involves a distillation unit subject to the control measures specified in this section.]	Combust the emissions in a flare that meets the requirements of §60.18 [40 CFR 60.662(b)] See b)(2)d.
f.	40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708) [In accordance with 40 CFR 60.700(b), this emissions unit involves a reactor process/recovery system subject to the control measures specified in this section.]	Combust the emissions in a flare that meets the requirements of §60.18 [40 CFR 60.702(b)] See b)(2)d.
g.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.18)	All of the General Provisions of 40 CFR Part 60, Subpart A are applicable except for the following: §60.8(d) does not apply to 40 CFR Subpart VVa [§60.487a(e)]; §60.7(c) does not apply to 40 CFR Subpart NNN [§60.665(k)]; and §60.7(c) does not apply to 40 CFR Subpart RRR [§60.705(k)]
h.	40 CFR Part 61, Subpart J (40 CFR 61.110 – 61.112)	Equipment leak standards and repair for equipment in benzene service [40 CFR 61.110] Comply with 40 CFR Part 61, Subpart V [§61.112(a)] See b)(2)c.
i.	40 CFR Part 61, Subpart V (40 CFR 61.240 - 61.247)	Equipment leak standards and repair for volatile hazardous air pollutants (VHAP/Benzene) [§61.242-1 through §61.242-10] Closed vent system(s) and control device requirements [§61.242-11] See b)(2)c. and b)(2)d.
j.	40 CFR Part 61, Subpart A	General Provisions [§61.01 through

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	(40 CFR 61.01 – 61.19)	§61.19]
k.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) [In accordance with 40 CFR 63.981, this emissions unit involves the control of air emissions from equipment leaks subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	Closed vent system and control equipment requirements [40 CFR 63.982 through 63.988] See b)(2)c. and b)(2)d.
l.	40 CFR Part 63, Subpart UU (40 CFR 63.1019 – 63.1039) [In accordance with 40 CFR 63.1019, this emissions unit involves closed vent systems, control devices and routing of air emissions to a fuel gas system for air emission control subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	Equipment leak standards and repair [40 CFR 63.1021 through 63.1037] See b)(2)c. and b)(2)d.
m.	40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1090 and 63.1097) [In accordance with 40 CFR 63.1083 and 63.1093, this emissions unit involves heat exchange systems subject to the requirements specified in this section.]	Leak monitoring and repair for cooling water [40 CFR 63.1085] See b)(2)c.
n.	40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114) [In accordance with 40 CFR 63.1100(a), this emissions unit involves process vents and equipment leaks subject to the control measures and requirements specified in this section.]	Reduce emissions of organic hazardous air pollutant (HAP) by 98 weight-percent; or reduce organic HAP or total organic compound (TOC) to a concentration of 20 parts per million by volume; whichever is less stringent, by venting emissions through a closed vent system to any combination of control devices and meet the requirements specified in §63.982(b) and c)(2). [40 CFR 63.1103(e)] See b)(2)d.
o.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	All of the General Provisions of 40 CFR Part 63, Subpart A apply except as indicated:

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		The provisions of §63.1 to §63.16 do not apply to 40 CFR Part 63, Subpart SS and Subpart UU except as noted in referencing subparts [§63.980 and §63.1019]; The provisions of §63.1 to §63.16 do not apply to 40 CFR Part 63, Subpart XX except as specified in 40 CFR Part 63, Subpart YY [§63.1083]; and §63.1100(b) – *Subpart A requirements* indicates which parts of the General Provisions in 40 CFR 63.1-16 apply to 40 CFR Part 63, Subpart YY
p.	OAC rule 3745-21-07	See b)(2)g.
q.	OAC rule 3745-21-13	See b)(2)h.

(2) Additional Terms and Conditions

a. The permittee shall employ BACT for this emissions unit. BACT has been determined to be the following:

i. for VOC emissions:

(a) use of closed vent systems controlled with high pressure (HP) flare achieving a destruction efficiency of 98% for VOC emissions from the following:

(i) startup/shutdown/maintenance/upsets;

(ii) spent caustic degassing drum;

(iii) spent caustic drain drum; and

(iv) pressure relief valve (PRV) leaks/releases.

(b) use of thermal oxidizer (TO) achieving a destruction efficiency of 99.5% for VOC emissions from the following:

(i) quench water drain drum;

(ii) wet air oxidation unit;

(iii) dimethyl disulphide (DMDS) tank; and

(iv) wash oil tank;

(c) tail gas from the hydrogenation section shall be used as fuel gas for firing in process cracking furnace(s);

(d) implementation of a facility specific program reducing fugitive component equipment leaks for applicable component equipment in the ethylene manufacturing unit;

(e) implementation of a program to minimize flaring.

ii. for GHG emissions:

(a) implementation of a facility specific program reducing fugitive component equipment leaks for applicable component equipment in the ethylene manufacturing unit.

b. BAT requirements for VOC emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20. It should be noted that emissions of GHG are not subject to BAT pursuant to OAC 3745-34-31(E)(8).

c. The following regulations establish requirements for component equipment leak control and repair for VOC, HAPs, VHAP/Benzene, and GHGs from the ethylene manufacturing unit:

i. for VOC:

(a) OAC rule 3745-31-10 through 20;

(b) ORC 3704.03(T);

(c) OAC rule 3745-21-09(DD); and

(d) 40 CFR Part 60, Subpart VVa.

ii. for HAP:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart UU.

iii. for VHAP/Benzene:

(a) 40 CFR Part 61, Subpart J; and

(b) 40 CFR Part 61, Subpart V.

iv. for GHGs:

(a) OAC rule 3745-31-10 through 20.

Note: A separate emissions unit (P807) associated with fugitive leaks of VOC, HAP, VHAP/Benzene, and GHGs from all component equipment at the facility subject to the leak control and repair regulations above has been established. For efficient permitting structure, the applicable requirements (limitations, operational restrictions, monitoring, record keeping, reporting, and testing) associated with equipment leak control and repair for VOC, HAP, VHAP/Benzene, and GHGs are contained within the requirements of emissions unit P807.

d. Closed vent systems controlled with HP flare and thermal oxidizer control of quench water drain drum are utilized to meet the requirements of the following regulations:

i. for VOC:

(a) OAC rule 3745-31-10 through 3745-31-20;

(b) ORC 3704.03(T);

(c) 40 CFR Part 60, Subpart NNN; and

(d) 40 CFR Part 60, Subpart RRR.

ii. for HAP:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart YY.

iii. for VHAP/Benzene:

(a) 40 CFR Part 61, Subpart J.

(b) 40 CFR Part 61, Subpart V.

Note: The thermal oxidizer(s) controlling quench water drain drum emissions and the closed vent systems controlled with HP flare are permitted as separate and individual emissions units (emissions units P001, P002, and P003 respectively). For efficient permitting structure, the applicable operational restrictions, monitoring, record keeping, reporting, and testing associated with thermal oxidizer control and the closed vent systems with HP flare control are contained within the requirements of emissions units P001, P002, and P003.

e. 40 CFR Part 60, Subpart Kb is applicable to the wash oil tank within the ethylene manufacturing line. Records of the volatile organic liquid (VOL) are required to be maintained per 40 CFR, Part 60.116b(c).

f. 40 CFR Part 60, Subpart Kb is not applicable to the DMDS tank within the ethylene manufacturing line in accordance with 40 CFR Part 60.112b(d)(2) due to the DMDS tank being a pressure vessel designed to operate in excess of 204.9 kPa (29.7 psi) and without emissions to the atmosphere.

g. The requirements of OAC rule 3745-21-07 are not applicable to this emissions unit in accordance with OAC rule 3745-21-07(M)(3)(c).

h. The requirements of OAC rule 3745-21-13 are not applicable to this emissions unit in accordance with OAC rule 3745-21-13(A)(1).

c) Operational Restrictions

(1) This permit utilizes incorporation by reference for the following operational restrictions:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

b. See 40 CFR Part 60, Subpart NNN* (40 CFR 60.660-668).

c. See 40 CFR Part 60, Subpart RRR* (40 CFR 60.700-708).

d. See 40 CFR Part 61, Subpart J* (40 CFR 61.110-112).

e. See 40 CFR Part 61, Subpart V* (40 CFR 61.240-247).

f. See 40 CFR Part 63, Subpart SS* (40 CFR 63.980-999).

g. See 40 CFR Part 63, Subpart UU* (40 CFR 63.1019-1039).

h. See 40 CFR Part 63, Subpart XX (40 CFR 63. 63.1080 – 63.1090 and 63.1097).

i. See 40 CFR Part 63, Subpart YY* (40 CFR 63.1100-1114).

*Operational restrictions associated with leak control and repair; closed vent systems controlled by HP flare; and thermal oxidizer(s) control of quench water drain drum are contained within the requirements of emissions unit P807, P001, P002, and P003.

d) Monitoring and/or Recordkeeping Requirements

(1) This permit utilizes incorporation by reference for the following monitoring and record keeping requirements:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a)*.

b. See 40 CFR Part 60, Subpart NNN* (40 CFR 60.660-668)*.

c. See 40 CFR Part 60, Subpart RRR* (40 CFR 60.700-708)*.

d. See 40 CFR Part 61, Subpart J* (40 CFR 61.110-112)*.

e. See 40 CFR Part 61, Subpart V* (40 CFR 61.240-247)*.

f. See 40 CFR Part 63, Subpart SS* (40 CFR 63.980-999).

g. See 40 CFR Part 63, Subpart UU* (40 CFR 63.1019-1039).

h. See 40 CFR Part 63, Subpart XX (40 CFR 63. 63.1080 – 63.1090 and 63.1097).

i. See 40 CFR Part 63, Subpart YY* (40 CFR 63.1100-1114).

*Monitoring and record keeping associated with leak control and repair; closed vent systems controlled with HP flare; and thermal oxidizer(s) control of quench water drain drum are contained within the requirements of emissions units P807, P001, P002, and P003.

e) Reporting Requirements

(1) This permit utilizes incorporation by reference for the following reporting requirements:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a)*.

b. See 40 CFR Part 60, Subpart NNN* (40 CFR 60.660-668)*.

c. See 40 CFR Part 60, Subpart RRR* (40 CFR 60.700-708)*.

d. See 40 CFR Part 61, Subpart J* (40 CFR 61.110-112)*.

e. See 40 CFR Part 61, Subpart V* (40 CFR 61.240-247)*.

f. See 40 CFR Part 63, Subpart SS* (40 CFR 63.980-999).

g. See 40 CFR Part 63, Subpart UU* (40 CFR 63.1019-1039).

h. See 40 CFR Part 63, Subpart XX (40 CFR 63. 63.1080 – 63.1090 and 63.1097).

i. See 40 CFR Part 63, Subpart YY* (40 CFR 63.1100-1114).

*Reporting associated with leak control and repair; closed vent systems controlled with HP flare; and thermal oxidizer(s) control of quench water drain drum are contained within the requirements of emissions unit P807, P001, P002, and P003.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emission Limitations:

i. Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)a.i.(a);

ii. Reduce emissions from quench water drain drum with a thermal oxidizer achieving a VOC destruction efficiency of 99.5%;

iii. Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Refer to emissions units P001, P002, and P003 for applicable compliance methods for the above emission limitations.

g) Miscellaneous Requirements

(1) None.

4. P802, High-Density Polyethylene Manufacturing Unit #1

Operations, Property and/or Equipment Description:

350 KTA high density polyethylene (HDPE) manufacturing process; includes catalyst activation & feed systems, reactor system, separation/degassing, solvent recovery and pelletizing sections, pellet blending, handling, and storage.

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)d., b)(2)g. and b)(2)h.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate matter 10 microns or less in size (PM_{10}), particulate matter 2.5 microns or less in size ($PM_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO_x), and carbon dioxide equivalents (CO_2e) See b)(2)a., b)(2)b. and b)(2)c.
b.	ORC 3704.03(T)	Best Available Technology (BAT) for CO See b)(2)d.
c.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)e. and b)(2)f.
d.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)g. and b)(2)h.
e.	OAC rule 3745-21-09(DD)	See b)(2)i.
f.	40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566) [In accordance with 40 CFR 60.560, this emissions unit involves equipment in the manufacturing of polyethylene subject to the requirements specified in this section.]	Combust continuous/intermittent vent emissions in a flare that meets the requirements of §60.18 [40 CFR 60.562-1(a)(1)(i)(C)] Detection and repair for equipment leaks of VOC [§60.562-2] See b)(2)j. and b)(2)k..

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
g.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	General Provisions [§60.1 through §60.19]
h.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) [In accordance with 40 CFR 63.981, this emissions unit involves the control of air emissions from equipment leaks subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	Closed vent system, fuel gas system, and control equipment requirements [40 CFR 63.982 through 63.988] See b)(2)i. and b)(2)j.
i.	40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550) [In accordance with 40 CFR 63.2435, this emissions unit is a miscellaneous organic chemical manufacturing process unit (MCPU) subject to the requirements specified in this section]	Reduce total organic HAP emissions from process vents by $\geq$ 98 % by weight by venting through closed vent system(s) to any combination of control devices or venting to a flare for process vents [§63.2455 & §63.2460]; Comply with the requirements of 40 CFR Part 63, Subpart UU for equipment leaks [§63.2480] Comply with the requirements of 40 CFR Part 63, Subpart G for process wastewater and liquid streams in open systems [§63.2485] Comply with the requirements of 40 CFR Part 63, Subpart F for heat exchange systems [§63.2490] See b)(2)i. and b)(2)j.
j.	40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480-7575) [In accordance with 40 CFR 63.7499 and 63.7575, the catalyst activator furnaces are new process heaters subject to the work practice standards specified in this section.]	Table 3 to 40 CFR Part 63, Subpart DDDDD – Work Practice Standards [40 CFR 63.7500].
k.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	General Provisions [§63.1 through §63.16] Table 12 to Subpart FFFF of 40 CFR Part

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		63 – Applicability of General Provisions to Subpart FFFF shows which parts of the General Provisions in 40 CFR 63.1-16 apply to MCPU operations. Table 10 to 40 CFR Part 63, Subpart DDDDD – Applicability of General Provisions (Subpart A) to Subpart DDDDD shows which parts of the General Provisions in 40 CFR Part 63.1 – 63.16 apply.
l.	OAC rule 3745-21-07	See b)(2)k.
m.	OAC rule 3745-21-13	See b)(2)l.
n.	OAC rule 3745-17-11(B)	See b)(2)m.
o.	OAC rule 3745-17-10(B)(1)	See b)(2)m.
p.	OAC rule 3745-17-07(A)	See b)(2)m.
q.	OAC rule 3745-18-06	See b)(2)n.
r.	OAC rule 3745-110-03	See b)(2)o.

The HDPE manufacturing process unit (emissions unit P802) shares a catalyst activation section with a second HDPE manufacturing process unit at the facility (emissions unit P803). Limitations and requirements for the shared activation section (which includes activator jacket vents, activator filter vents, co-catalyst container change activity, and co-catalyst disposal) are contained within the terms and conditions below and are also contained in the terms and conditions of emissions unit P803).

(2) Additional Terms and Conditions

a. BACT requirements for the catalyst activation section of the HPDE manufacturing process has been determined to be the following:

i. combustion emissions associated with the jackets of two catalyst activator furnaces shall meet the following standards and limitations:

(a) for NO_x emissions:

(i) 0.098 lb/MMBtu;

(ii) 0.51 lb/hr (for each individual furnace); and

(iii) 4.47 tons per rolling 12-month period for the two activator furnaces combined.

(b) for CO emissions:

(i) 0.082 lb/MMBtu;

(ii) 0.43 lb/hr (for each individual furnace); and

(iii) 3.74 tons per rolling 12-month period for the two activator furnaces combined.

(c) for VOC emissions:

(i) 0.0054 lb/MMBtu;

(ii) 0.03 lb/hr (for each individual furnace); and

(iii) 0.25 ton per rolling 12-month period for two activator furnaces combined.

(d) for emissions of PM_{10} and $PM_{2.5}$**:

(i) 0.0075 lb/MMBtu;

(ii) 0.04 lb/hr (for each individual furnace);

(iii) 0.34 ton per rolling 12-month period for two activator furnaces combined; and

(iv) visible particulate emissions from each individual catalyst activator furnace stack shall not exceed five percent opacity, as a six-minute average.

**All emissions of particulate matter are PM_{10}/$PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

(e) for CO_2e emissions:

(i) 117 lbs/MMBtu; and

(ii) 5,335 tons per rolling 12-month period for two activator furnaces combined.

b. BACT requirements for HDPE manufacturing process for VOC emissions other than the catalyst activation furnace combustion emissions (see b)(2)a.i. above) has been determined to be the following:

i. use of closed vent system controlled with high pressure (HP) flare achieving a destruction efficiency of 98% for VOC emissions from the following:

(a) intermediate flash slurry sampler;

(b) LSR lights condenser;

(c) heavies column; and

(d) pressure relief valve (PRV) leaks/releases;

ii. use of thermal oxidizer (TO) achieving a destruction efficiency of 99.5% for VOC emissions from the following:

(a) LPSR condensate separator; and

(b) powder conveying package vent;

iii. residual VOC in the polyethylene resin exiting the extruder shall be less than 80 ppmv;

iv. The combined VOC emissions for all HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 28.00 tons per rolling 12-month period;

v. implementation of facility specific program reducing fugitive component equipment leaks including applicable component equipment in the polyethylene manufacturing line; and

vi. implementation of a program to minimize flaring.

c. BACT requirements for HDPE manufacturing process for $PM_{10}/PM_{2.5}$* emissions other than the catalyst activation furnace combustion emissions (see b)(2)a.i. above) has been determined to be the following:

i. use of fabric filtration control for achieving a maximum outlet concentration of 0.005 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) catalyst activator jacket vent (R-201A):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(b) catalyst activator jacket vent (R-201B):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(c) catalyst filter vent (S-203A):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(d) catalyst filter vent (S-203B):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(e) extruder vent filter (3S-603):

(i) 0.015 lb/hr and 0.065 ton per rolling 12-month period.

(f) additive vent filter (3S-604):

(i) 0.04 lb/hr and 0.175 ton per rolling 12-month period.

(g) additive feeder vents (3Q-602A through F):

(i) 0.001 lb/hr and 0.0044 ton per rolling 12-month period for each individual vent (5 individual vents).

ii. use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) pellet conveying hopper vent (3V-607):

(i) 0.004 lb/hr & 0.0175 ton per rolling 12-month period.

(b) pellet hopper vent (3V-702):

(i) 0.06 lb/hr & 0.263 tons per rolling 12-month period.

(c) pellet & off-spec blender/silo vents (3V-701A through E) & (PE1-19):

(i) 0.088 lb/hr & 0.386 ton per rolling 12-month period for each individual vent (6 individual vents).

iii. $PM_{10}/PM_{2.5}$ emissions for the pellet dryer fan vent (3C-603) shall not exceed a maximum outlet concentration of 0.002 gr/dscf and the following lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$:

(i) 0.134 lb/hr & 0.587 ton per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

iv. visible particulate emissions from each process vent stack controlled with fabric filtration (as identified in b)(2)c.) shall not exceed five percent opacity, as a six-minute average.

v. catalyst activation system vents associated with co-catalyst container changes shall be controlled by passing vent streams through a seal pot containing mineral oil resulting only in emissions of nitrogen gas used in co-catalyst transfer.

vi. there shall be no visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit.

d. BAT requirements for VOC and $PM_{10}/PM_{2.5}$ emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20. It should be noted that emissions of GHG are not subject to BAT pursuant to OAC 3745-34-31(E)(8).

e. BAT requirements under OAC rule 3745-31-05(A)(3) have been determined to be:

i. for sulfur dioxide (SO_2) emissions - use of natural gas fuel in the furnaces in the catalyst activation section of the HPDE manufacturing process;

ii. for CO and NO_x – compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

f. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

g. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of NO_x, CO, and SO_2 from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable).

h. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

i. The following regulations establish requirements for component equipment leak control and repair for VOC, HAPs, and greenhouse gases (GHGs) from the polyethylene manufacturing line:

i. for VOCs:

(a) OAC rule 3745-31-10 through 20;

(b) ORC 3704.03(T);

(c) OAC rule 3745-21-09(DD); and

(d) 40 CFR Part 60, Subpart DDD;

ii. for HAPs:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF;

iii. for GHGs:

(a) OAC rule 3745-31-10 through 20.

Note: A separate emissions unit (P807) associated with fugitive leaks of VOC, HAP, VHAP/Benzene*, and GHGs from all component equipment at the facility subject to the leak control and repair regulations above has been established. For efficient permitting structure applicable requirements (limitations, operational restrictions, monitoring, record keeping, reporting, and testing) associated with equipment leak control and repair for VOC, HAP, VHAP/Benzene*, and GHGs are contained within the requirements of emissions unit P807.

*It should be noted HDPE manufacturing operations are not subject to regulations for VHAP/Benzene emissions under 40 CFR Part 61.

j. Closed vent systems controlled with HP flare and thermal oxidizer control of LPSR condensate separator, and powder conveying package vent are utilized to meet the requirements of the following regulations:

i. for VOC:

(a) OAC rule 3745-31-10 through 3745-31-20;

(b) ORC 3704.03(T); and

(c) 40 CFR Part 60, Subpart DDD.

ii. for HAP:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF.

The thermal oxidizer(s) utilized for control and the closed vent system controlled with HP flare are permitted as separate and individual emissions units (emissions units P001, P002, and P003 respectively). For efficient permitting structure, the applicable operational restrictions, monitoring, record keeping, reporting, and testing associated with thermal oxidizer control and the closed vent systems with flare control are contained with the requirements of emissions units P001, P002, and P003.

k. This emissions unit is not subject to OAC rule 3745-21-07 in accordance with OAC rule 3745-21-07(M)(3)(c).

l. This emissions unit is not subject to OAC rule 3745-21-13 in accordance with OAC rule 3745-21-13(A)(1).

m. The emission limitation specified by this rule is less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

n. Exempt pursuant to OAC rule 3745-18-06(A) since only natural gas fuel is burned in this emissions unit.

o. Exempt pursuant to OAC rule 3745-110-03(K)(16).

p. The catalyst activation section is shared by the two HDPE manufacturing process units contained in this permit (emissions units P802 and P803). Limitations and requirements for the catalyst activation section are presented within the individual terms and conditions for emissions units P802 and P803).

q. The catalyst activator jacket vents and the catalyst activator filter vents are part of the catalyst activation section which is shared by the two HDPE manufacturing process units contained in this permit (emissions units P802 and P803).

Limitations and requirements for the catalyst activation section are presented within the individual terms and conditions for emissions units P802 and P803).

c) Operational Restrictions

(1) The permittee shall burn only natural gas fuel with a maximum sulfur content not to exceed 0.005 gr/dscf in this emissions unit.

(2) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(3) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(4) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

(5) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480 – 63.7575).

d) Monitoring and/or Recordkeeping Requirements

(1) For each day during which the permittee burns a fuel other than natural gas fuel with a maximum sulfur content of 0.005 gr/dscf, the permittee shall maintain a record of the type and quantity of fuel burned in this emissions unit.

(2) The permittee shall determine the VOC content in the polyethylene resin exiting the extruder at least once per week using Test Method 24 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources") or other method as approved by Ohio EPA.

(3) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stacks for this emissions unit identified in b)(2)c. The presence or absence of any visible emissions for each individual stack shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. whether the emissions are representative of normal operations;

c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

d. the total duration of any visible emissions incident; and

e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal

operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

(4) The permittee shall perform daily checks, when the emissions unit is in operation, for any visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. the total duration of any visible emissions incident; and

c. any corrective actions taken to eliminate the visible emissions.

(5) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(6) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(7) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

(8) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480 – 63.7575).

e) Reporting Requirements

(1) The permittee shall submit deviation (excursion) reports that identify each day when a fuel other than natural gas was burned in this emissions unit. Each report shall be submitted within 30 days after the deviation occurs.

(2) The permittee shall submit quarterly deviation (excursion) reports that identify the results of any testing showing the residual VOC in the polyethylene resin exiting the extruder being greater than or equal to 80 ppmv.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(3) The permittee shall submit semiannual written reports that identify:

a. all days during which any visible particulate emissions were observed from the stacks for this emissions unit identified in b)(2)c.;

b. all days during which any visible emissions of fugitive particulate were observed from the discharge of co-catalyst material to the atmospheric sand pit; and

c. any corrective actions taken to eliminate the visible particulate emissions.

These reports shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency) by January 31 and July 31 of each year and shall cover the previous 6-month period.

(4) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(5) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(6) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

(7) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480 – 63.7575).

f) Testing Requirements

(1) The permittee shall conduct, or have conducted, emission testing for this emissions unit in accordance with the following requirements:

a. The emission testing shall be conducted within 180 days after initial startup of the emissions unit;

b. The emission testing shall be conducted to demonstrate compliance with:

i. the allowable emissions of 0.002 gr/dscf and 0.134 lb/hr for $PM_{10}/PM_{2.5}$ from the pellet dryer fan vent (3C-603);

ii. the opacity limitation of five percent, as a six-minute average from the pellet dryer fan vent (3C-603).

c. The following test methods shall be employed to demonstrate compliance with the allowable emission limitations:

i. For $PM_{10}/PM_{2.5}$ – Methods 1-4 of 40 CFR Part 60, Appendix A, and Methods 201, 201A, and 202 of 40 CFR Part 51, Appendix M and

ii. For opacity – Method 9 of 40 CFR, Part 60, Appendix A. Opacity readings shall be taken during the sampling runs for testing of the allowable emission limitations in f)(1)b.i. and f)(1)b.ii.

Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

d. The test(s) shall be conducted under those representative conditions that challenge to the fullest extent possible a facility's ability to meet the applicable emissions limits and/or control requirements, unless otherwise specified or approved by the appropriate Ohio EPA District Office or local air agency. Although this generally consists of operating the emissions unit at its maximum material input/production rates and results in the highest emission rate of the tested pollutant, there may be circumstances where a lower emissions loading is deemed the most challenging control scenario. Failure to test under these conditions is justification for not accepting the test results as a demonstration of compliance.

e. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the appropriate Ohio EPA District Office or local air agency. The "Intent to Test" notification shall describe in detail the

proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA District Office's or local air agency's refusal to accept the results of the emission test(s).

f. Personnel from the appropriate Ohio EPA District Office or local air agency shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

g. A comprehensive written report on the results of the emissions test(s) shall be signed by the person or persons responsible for the tests and submitted to the appropriate Ohio EPA District Office or local air agency within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the appropriate Ohio EPA District Office or local air agency.

(2) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

i. Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)b.;

ii. Reduce emissions from LPSR condensate separator, and powder conveying package vent with a thermal oxidizer achieving a VOC destruction efficiency of 99.5%;

iii. Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Refer to emissions unit P001, P002, P003, and P807 for applicable compliance methods for the above emission limitations.

b. Emissions Limitations:

i. Combustion emissions associated with the jackets of two catalyst activator furnaces:

(a) for NO_x emissions:

(i) 0.098 lb/MMBtu;

(ii) 0.51 lb/hr (for each individual furnace); and

(iii) 4.47 tons per rolling 12-month period for the two activator furnaces combined.

(b) for CO emissions:

(i) 0.082 lb/MMBtu;

(ii) 0.43 lb/hr (for each individual furnace); and

(iii) 3.74 tons per rolling 12-month period for the two activator furnaces combined.

(c) for VOC emissions:

(i) 0.0054 lb/MMBtu;

(ii) 0.03 lb/hr (for each individual furnace); and

(iii) 0.25 ton per rolling 12-month period for two activator furnaces combined.

(d) for emissions of PM_{10} and $PM_{2.5}$:

(i) 0.0075 lb/MMBtu;

(ii) 0.04 lb/hr (for each individual furnace); and

(iii) 0.34 ton per rolling 12-month period for two activator furnaces combined.

(e) for CO_2e emissions:

(i) 117 lbs/MMBtu; and

(ii) 5,335 tons per rolling 12-month period for two activator furnaces combined.

Applicable Compliance Method:

The lb/MMBtu, lb/hr, and tons/rolling 12-month period allowable emission limitations were established based on the potential to emit* for the combustion emissions from the catalyst activator furnace jackets. Therefore, no record keeping, deviation reporting, or compliance method calculations are required to demonstrate compliance.

*The potential to emit (PTE) for combustion emissions was determined as follows:

The PTE in lb/MMBtu was determined using AP-42 emission factors from Tables 1.4-1 and 1.4-2 (revised 7/98);

The PTE in lb/hr was determined by multiplying the potential emissions in lb/MMBtu by a maximum heat input of 5.2 MMBtu/hr for each individual furnace;

The PTE in tons per rolling 12-month period was determined by multiplying the combined potential lb/hr emissions from both furnaces by a maximum operating schedule of 8,760 hours per year and dividing by 2,000 lbs/ton.

c. Emissions Limitations:

i. $PM_{10}/PM_{2.5}$ emission limitations of 0.005 gr/dscf and lb/hr and tons per rolling 12-month period limitations indicated for the following process vents:

(a) catalyst activator jacket vent (R-201A):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(b) catalyst activator jacket vent (R-201B):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(c) catalyst filter vent (S-203A):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(d) catalyst filter vent (S-203B):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(e) extruder vent filter (3S-603):

(i) 0.015 lb/hr and 0.065 ton per rolling 12-month period.

(f) additive vent filter (3S-604):

(i) 0.04 lb/hr and 0.175 ton per rolling 12-month period.

(g) additive feeder vent (3Q-602A through F):

(i) 0.001 lb/hr (for each individual vent) and 0.0044 ton per rolling 12-month period (for each individual vent).

ii. $PM_{10}/PM_{2.5}$ emission limitations of 0.002 gr/dscf and lb/hr and tons per rolling 12-month period limitations indicated for the following process vents:

(a) pellet dryer fan vent (3C-603):

(i) 0.134 lb/hr & 0.587 ton per rolling 12-month period.

(b) pellet conveying hopper vent (3V-607):

(i) 0.004 lb/hr & 0.0175 ton per rolling 12-month period.

(c) pellet hopper vent (3V-702):

(i) 0.06 lb/hr & 0.263 tons per rolling 12-month period.

(d) pellet & off-spec blender/silo vents (3V-701A through E) & (PE1-19):

(i) 0.088 lb/hr & 0.386 ton per rolling 12-month period for each individual vent (6 individual vents).

Applicable Compliance Method:

The 0.005 gr/dscf (for sources upstream of pellet dryer) and 0.002 gr/dscf (for pellet dryer and sources downstream of the pellet dryer) were established in accordance with BACT requirements as maximum outlet concentration standards.

The lb/hr limitations were established by multiplying the emission limitation of 0.005 gr/dscf or 0.002 gr/dscf by the following maximum volumetric air flow rates (cfm) and multiplying by lb/7,000 gr and 60 min/hr:

catalyst activator jacket vent (R-201A) – 2,333 cfm

catalyst activator jacket vent (R-201B) – 2,333 cfm

catalyst activator jacket filter vent (S-203A) – 35 cfm

catalyst activator jacket filter vent (S-203B) – 35 cfm

extruder vent filter (3S-603) – 350 cfm

additive vent filter (3S-604) – 933 cfm

additive feeder vent (3Q-602A through F) – 23 cfm (for each individual vent)

pellet dryer fan vent (3C-603) – 7,817 cfm

pellet conveying hopper vent (3V-607) – 233 cfm

pellet hopper vent (3V-702) – 3,500 cfm

pellet & off-spec blender/silo vents (3V-701A through E) & (PE1-19) – 5,133 cfm (for each individual vent)

If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

The tons per rolling 12-month period limitations were established by multiplying the lb/hr limitations by a maximum operating schedule of 8,760 hours per year and dividing by 2,000 lbs/ton. Therefore, provided compliance is shown with the lb/hr limitations, compliance with the rolling 12-month limitations shall also be demonstrated.

d. Emissions Limitations:

Visible particulate emissions from each individual catalyst activator furnace stack shall not exceed five percent opacity, as a six-minute average.

Visible particulate emissions from each process vent stack controlled with fabric filtration (as identified in b)(2)c.) shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

If required, compliance shall be demonstrated using Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources").

e. Emissions Limitation:

The combined VOC emissions for all HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 28.00 tons per rolling 12-month period.

Applicable Compliance Method:

The annual limitation represents the potential to emit based on a maximum production capacity of 350,000 metric tons of polyethylene resin pellets and a residual VOC in extruded pellets of less than 80 ppmv. Therefore, provided compliance is shown with the residual VOC requirement of less than 80 ppmv, compliance with the annual emission limitation shall also be demonstrated.

f. Emissions Limitation:

There shall be no visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit.

Applicable Compliance Method:

If required, compliance with the visible emissions limitation for the fugitive dust identified in this permit shall be determined in accordance with U.S. EPA Method 22

g) Miscellaneous Requirements

(1) None.

5. P803, High-Density Polyethylene Manufacturing Unit #2

Operations, Property and/or Equipment Description:

350 KTA high density polyethylene (HDPE) manufacturing process; includes catalyst activation & feed systems, reactor system, separation/degassing, solvent recovery and pelletizing sections, pellet blending, handling, and storage.

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)d., b)(2)g. and b)(2)h.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate matter 10 microns or less in size (PM_{10}), particulate matter 2.5 microns or less in size ($PM_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO_x) and carbon dioxide equivalents (CO_2e) See b)(2)a., b)(2)b. and b)(2)c.
b.	ORC 3704.03(T)	Best Available Technology (BAT) for CO See b)(2)d.
c.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)e. and b)(2)f.
d.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)g. and b)(2)h.
e.	OAC rule 3745-21-09(DD)	See b)(2)i.
f.	40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566) [In accordance with 40 CFR 60.560, this emissions unit involves equipment in the manufacturing of polyethylene subject to the requirements specified in this section.]	Combust continuous/intermittent vent emissions in a flare that meets the requirements of §60.18 [40 CFR 60.562-1(a)(1)(i)(C)] Detection and repair for equipment leaks of VOC [§60.562-2] See b)(2)j. and b)(2)k..

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
g.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	General Provisions [§60.1 through §60.19]
h.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) [In accordance with 40 CFR 63.981, this emissions unit involves the control of air emissions from equipment leaks subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	Closed vent system, fuel gas system, and control equipment requirements [40 CFR 63.982 through 63.988] See b)(2)i. and b)(2)j.
i.	40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550) [In accordance with 40 CFR 63.2435, this emissions unit is a miscellaneous organic chemical manufacturing process unit (MCPU) subject to the requirements specified in this section]	Reduce total organic HAP emissions from process vents by $\geq$ 98 % by weight by venting through closed vent system(s) to any combination of control devices or venting to a flare for process vents [§63.2455 & §63.2460]; Comply with the requirements of 40 CFR Part 63, Subpart UU for equipment leaks [§63.2480] Comply with the requirements of 40 CFR Part 63, Subpart G for process wastewater and liquid streams in open systems [§63.2485] Comply with the requirements of 40 CFR Part 63, Subpart F for heat exchange systems [§63.2490] See b)(2)i. and b)(2)j.
j.	40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480-7575) [In accordance with 40 CFR 63.7499 and 63.7575, the catalyst activator furnaces are new process heaters subject to the work practice standards specified in this section.]	Table 3 to 40 CFR Part 63, Subpart DDDDD – Work Practice Standards [40 CFR 63.7500].
k.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	General Provisions [§63.1 through §60.16] Table 12 to Subpart FFFF of 40 CFR Part

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		63 – Applicability of General Provisions to Subpart FFFF shows which parts of the General Provisions in 40 CFR 63.1-16 apply to MCPU operations. Table 10 to 40 CFR Part 63, Subpart DDDD – Applicability of General Provisions (Subpart A) to Subpart DDDDD shows which parts of the General Provisions in 40 CFR Part 63.1 – 63.16 apply.
l.	OAC rule 3745-21-07	See b)(2)k.
m.	OAC rule 3745-21-13	See b)(2)l.
n.	OAC rule 3745-17-11(B)	See b)(2)m.
o.	OAC rule 3745-17-10(B)(1)	See b)(2)m.
p.	OAC rule 3745-17-07(A)	See b)(2)m.
q.	OAC rule 3745-18-06	See b)(2)n.
r.	OAC rule 3745-110-03	See b)(2)o.

The HDPE manufacturing process unit (emissions unit P802) shares a catalyst activation section with a second HDPE manufacturing process unit at the facility (emissions unit P803). Limitations and requirements for the shared activation section (which includes activator jacket vents, activator filter vents, co-catalyst container change activity, and co-catalyst disposal) are contained within the terms and conditions below and are also contained in the terms and conditions of emissions unit P803).

(2) Additional Terms and Conditions

a. BACT requirements for the catalyst activation section of the HPDE manufacturing process has been determined to be the following:

i. combustion emissions associated with the jackets of two catalyst activator furnaces shall meet the following standards and limitations:

(a) for NO_x emissions:

(i) 0.098 lb/MMBtu;

(ii) 0.51 lb/hr (for each individual furnace); and

(iii) 4.47 tons per rolling 12-month period for the two activator furnaces combined.

(b) for CO emissions:

(i) 0.082 lb/MMBtu;

(ii) 0.43 lb/hr (for each individual furnace); and

(iii) 3.74 tons per rolling 12-month period for the two activator furnaces combined.

(c) for VOC emissions:

(i) 0.0054 lb/MMBtu;

(ii) 0.03 lb/hr (for each individual furnace); and

(iii) 0.25 ton per rolling 12-month period for two activator furnaces combined.

(d) for emissions of PM_{10} and $PM_{2.5}$**:

(i) 0.0075 lb/MMBtu;

(ii) 0.04 lb/hr (for each individual furnace);

(iii) 0.34 ton per rolling 12-month period for two activator furnaces combined; and

(iv) visible particulate emissions from each individual catalyst activator furnace stack shall not exceed five percent opacity, as a six-minute average.

**All emissions of particulate matter are PM_{10}/$PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

(e) for CO_2e emissions:

(i) 117 lbs/MMBtu; and

(ii) 5,335 tons per rolling 12-month period for two activator furnaces combined.

b. BACT requirements for HDPE manufacturing process for VOC emissions other than the catalyst activation furnace combustion emissions (see b)(2)a.i. above) has been determined to be the following:

i. use of closed vent system controlled with high pressure (HP) flare achieving a destruction efficiency of 98% for VOC emissions from the following:

(a) intermediate flash slurry sampler;

(b) LSR lights condenser;

(c) heavies column; and

(d) pressure relief valve (PRV) leaks/releases.

ii. use of thermal oxidizer (TO) achieving a destruction efficiency of 99.5% for VOC emissions from the following:

(a) LPSR condensate separator; and

(b) powder conveying package vent.

iii. residual VOC in the polyethylene resin exiting the extruder shall be less than 80 ppmv;

iv. The combined VOC emissions for all HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 28.00 tons per rolling 12-month period;

v. implementation of facility specific program reducing fugitive component equipment leaks including applicable component equipment in the polyethylene manufacturing line; and

vi. implementation of a program to minimize flaring.

c. BACT requirements for HDPE manufacturing process for $PM_{10}/PM_{2.5}$* emissions other than the catalyst activation furnace combustion emissions (see b)(2)a.i. above) has been determined to be the following:

i. use of fabric filtration control for achieving a maximum outlet concentration of 0.005 gr/dscf for $PM_{10}/PM_{2.5}$ and lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) catalyst activator jacket vent (R-201A):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(b) catalyst activator jacket vent (R-201B):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(c) catalyst filter vent (S-203A):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(d) catalyst filter vent (S-203B):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(e) extruder vent filter (4S-603):

(i) 0.015 lb/hr and 0.065 ton per rolling 12-month period.

(f) additive vent filter (4S-604):

(i) 0.04 lb/hr and 0.175 ton per rolling 12-month period.

(g) additive feeder vents (4Q-602A through F):

(i) 0.001 lb/hr and 0.0044 ton per rolling 12-month period for each individual vent (5 individual vents).

ii. use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) pellet conveying hopper vent (4V-607):

(i) 0.004 lb/hr and 0.0175 ton per rolling 12-month period.

(b) pellet hopper vent (4V-702):

(i) 0.06 lb/hr and 0.263 ton per rolling 12-month period.

(c) pellet & off-spec blender/silo vents (4V-701A through E) & (PE2-19):

(i) 0.088 lb/hr and 0.386 ton per rolling 12-month period for each individual vent (6 individual vents).

iii. $PM_{10}/PM_{2.5}$ emissions for the pellet dryer fan vent (4C-603) shall not exceed a maximum outlet concentration of 0.002 gr/dscf and the following lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$:

(i) 0.134 lb/hr & 0.587 ton per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

iv. visible particulate emissions from each process vent stack controlled with fabric filtration (as identified in b)(2)c.) shall not exceed five percent opacity, as a six-minute average.

v. catalyst activation system vents associated with co-catalyst container changes shall be controlled by passing vent streams through a seal pot containing mineral oil resulting only in emissions of nitrogen gas used in co-catalyst transfer.

vi. there shall be no visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit.

d. BAT requirements for VOC and $PM_{10}/PM_{2.5}$ emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20. It should be noted that emissions of GHG are not subject to BAT under ORC 3704.03(T).

e. BAT requirements under OAC rule 3745-31-05(A)(3) have been determined to be:

i. for sulfur dioxide (SO_2) emissions - use of natural gas fuel in the furnaces in the catalyst activation section of the HPDE manufacturing process;

ii. for CO and NOx – compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

f. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

g. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of NO_x, CO, and SO_2 from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable).

h. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

i. The following regulations establish requirements for component equipment leak control and repair for VOC, HAPs, and GHGs from the polyethylene manufacturing line:

i. for VOCs:

(a) OAC rule 3745-31-10 through 20;

(b) ORC 3704.03(T);

(c) OAC rule 3745-21-09(DD);

(d) 40 CFR Part 60, Subpart DDD;

ii. for HAPs:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF.

iii. for GHGs:

(a) OAC rule 3745-31-10 through 20.

Note: A separate emissions unit (P807) associated with fugitive leaks of VOC, HAP, VHAP/Benzene*, and GHGs from all component equipment at the facility subject to the leak control and repair regulations above has been established. For efficient permitting structure applicable requirements (limitations, operational restrictions, monitoring, record keeping, reporting, and testing) associated with equipment leak control and repair for VOC, HAP, VHAP/Benzene*, and GHGs are contained within the requirements of emissions unit P807.

*It should be noted HDPE manufacturing operations are not subject to regulations for VHAP/Benzene emissions under 40 CFR Part 61.

j. Closed vent systems controlled with HP flare and thermal oxidizer control of LPSR condensate separator, and powder conveying package vent are utilized to meet the requirements of the following regulations:

i. for VOC:

(a) OAC rule 3745-31-10 through 3745-31-20;

(b) ORC 3704.03(T); and

(c) 40 CFR Part 60, Subpart DDD.

ii. for HAP:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF.

The thermal oxidizer(s) utilized for control and the closed vent system controlled with HP flare are permitted as separate and individual emissions units (emissions units P001, P002, and P003 respectively). For efficient permitting structure, the applicable operational restrictions, monitoring, record keeping, reporting, and testing associated with thermal oxidizer control and the closed vent systems with flare control are contained with the requirements of emissions units P001, P002, and P003.

k. This emissions unit is not subject to OAC rule 3745-21-07 in accordance with OAC rule 3745-21-07(M)(3)(c).

l. This emissions unit is not subject to OAC rule 3745-21-13 in accordance with OAC rule 3745-21-13(A)(1).

m. The emission limitation specified by this rule is less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

n. Exempt pursuant to OAC rule 3745-18-06(A) since only natural gas fuel is burned in this emissions unit.

o. Exempt pursuant to OAC rule 3745-110-03(K)(16).

c) Operational Restrictions

(1) The permittee shall burn only natural gas fuel with a maximum sulfur content not to exceed 0.005 gr/dscf in this emissions unit.

(2) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(3) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(4) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

(5) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480 – 63.7575).

d) Monitoring and/or Recordkeeping Requirements

(1) For each day during which the permittee burns a fuel other than natural gas fuel with a maximum sulfur content of 0.005 gr/dscf, the permittee shall maintain a record of the type and quantity of fuel burned in this emissions unit.

(2) The permittee shall determine the VOC content in the polyethylene resin exiting the extruder at least once per week using Test Method 24 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources") or other method as approved by Ohio EPA.

(3) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stacks for this emissions unit identified in b)(2)c. The presence or absence of any visible emissions for each individual stack shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. whether the emissions are representative of normal operations;

c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

d. the total duration of any visible emissions incident; and

e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

(4) The permittee shall perform daily checks, when the emissions unit is in operation, for any visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. the total duration of any visible emissions incident; and

c. any corrective actions taken to eliminate the visible emissions.

(5) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(6) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(7) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

(8) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480 – 63.7575).

e) Reporting Requirements

(1) The permittee shall submit deviation (excursion) reports that identify each day when a fuel other than natural gas was burned in this emissions unit. Each report shall be submitted within 30 days after the deviation occurs.

(2) The permittee shall submit quarterly deviation (excursion) reports that identify the results of any testing showing the residual VOC in the polyethylene resin exiting the extruder being greater than or equal to 80 ppmv.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(3) The permittee shall submit semiannual written reports that identify:

a. all days during which any visible particulate emissions were observed from the stacks for this emissions unit identified in b)(2)c.;

b. all days during which any visible emissions of fugitive particulate were observed from the discharge of co-catalyst material to the atmospheric sand pit; and

c. any corrective actions taken to eliminate the visible particulate emissions.

These reports shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency) by January 31 and July 31 of each year and shall cover the previous 6-month period.

(4) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(5) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(6) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

(7) See 40 CFR Part 63, Subpart DDDDD (40 CFR 63.7480 – 63.7575).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

i. Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)b.;

ii. Reduce emissions from LPSR condensate separator, and powder conveying package vent with a thermal oxidizer achieving a VOC destruction efficiency of 99.5%;

iii. Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Refer to emissions unit P001, P002, P003, and P807 for applicable compliance methods for the above emission limitations.

b. Emissions Limitations:

i. Combustion emissions associated with the jackets of two catalyst activator furnaces:

(a) for NO_x emissions:

(i) 0.098 lb/MMBtu;

(ii) 0.51 lb/hr (for each individual furnace); and

(iii) 4.47 tons per rolling 12-month period for the two activator furnaces combined.

(b) for CO emissions:

(i) 0.082 lb/MMBtu;

(ii) 0.43 lb/hr (for each individual furnace); and

(iii) 3.74 tons per rolling 12-month period for the two activator furnaces combined.

(c) for VOC emissions:

(i) 0.0054 lb/MMBtu;

(ii) 0.03 lb/hr (for each individual furnace); and

(iii) 0.25 ton per rolling 12-month period for two activator furnaces combined.

(d) for emissions of PM_{10} and $PM_{2.5}$:

(i) 0.0075 lb/MMBtu;

(ii) 0.04 lb/hr (for each individual furnace); and

(iii) 0.34 ton per rolling 12-month period for two activator furnaces combined.

(e) for CO_2e emissions:

(i) 117 lbs/MMBtu; and

(ii) 5,335 tons per rolling 12-month period for two activator furnaces combined.

Applicable Compliance Method:

The lb/MMBtu, lb/hr, and tons/rolling 12-month period allowable emission limitations were established based on the potential to emit* for the combustion emissions from the catalyst activator furnace jackets. Therefore, no record keeping, deviation reporting, or compliance method calculations are required to demonstrate compliance.

*The potential to emit (PTE) for combustion emissions was determined as follows:

The PTE in lb/MMBtu was determined using AP-42 emission factors from Tables 1.4-1 and 1.4-2 (revised 7/98);

The PTE in lb/hr was determined by multiplying the potential emissions in lb/MMBtu by a maximum heat input of 5.2 MMBtu/hr for each individual furnace;

The PTE in tons per rolling 12-month period was determined by multiplying the combined potential lb/hr emissions from both furnaces by a maximum operating schedule of 8,760 hours per year and dividing by 2000 lbs/ton.

c. Emissions Limitations:

i. $PM_{10}/PM_{2.5}$ emission limitations of 0.005 gr/dscf and lb/hr and tons per rolling 12-month period limitations indicated for the following process vents:

(a) catalyst activator jacket vent (R-201A):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(b) catalyst activator jacket vent (R-201B):

(i) 0.10 lb/hr and 0.44 ton per rolling 12-month period.

(c) catalyst filter vent (S-203A):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(d) catalyst filter vent (S-203B):

(i) 0.0015 lb/hr and 0.006 ton per rolling 12-month period.

(e) extruder vent filter (4S-603):

(i) 0.015 lb/hr and 0.065 ton per rolling 12-month period.

(f) additive vent filter (4S-604):

(i) 0.04 lb/hr and 0.175 ton per rolling 12-month period.

(g) additive feeder vent (4Q-602A through F):

(i) 0.001 lb/hr (for each individual vent) and 0.0044 ton per rolling 12-month period (for each individual vent).

ii. $PM_{10}/PM_{2.5}$ emission limitations of 0.002 gr/dscf and lb/hr and tons per rolling 12-month period limitations indicated for the following process vents:

(a) pellet dryer fan vent (4C-603):

(i) 0.134 lb/hr and 0.587 ton per rolling 12-month period.

(b) pellet conveying hopper vent (4V-607):

(i) 0.004 lb/hr and 0.0175 ton per rolling 12-month period.

(c) pellet hopper vent (4V-702):

(i) 0.06 lb/hr and 0.263 ton per rolling 12-month period.

(d) pellet & off-spec blender/silo vents (4V-701A through E) & (PE2-19):

(i) 0.088 lb/hr (for each individual vent) and 0.386 ton per rolling 12-month period (for each individual vent).

Applicable Compliance Method:

The 0.005 gr/dscf (for sources upstream of pellet dryer) and 0.002 gr/dscf (for pellet dryer and sources downstream of the pellet dryer) were established in

accordance with BACT requirements as maximum outlet concentration standards.

The lb/hr limitations were established by multiplying the emission limitation of 0.005 gr/dscf or 0.002 gr/dscf by the following maximum volumetric air flow rates (cfm) and multiplying by lb/7,000 gr and 60 min/hr:

catalyst activator jacket vent (R-201A) – 2,333 cfm

catalyst activator jacket vent (R-201B) – 2,333 cfm

catalyst activator filter vent (S-203A) – 35 cfm

catalyst activator filter vent (S-203B) – 35 cfm

extruder vent filter (4S-603) – 350 cfm

additive vent filter (4S-604) – 933 cfm

additive feeder vent (4Q-602A through F) – 23 cfm (for each individual vent)

pellet dryer fan vent (4C-603) – 7,817 cfm

pellet conveying hopper vent (4V-607) – 233 cfm

pellet hopper vent (4V-702) – 3,500 cfm

pellet & off-spec blender/silo vents (4V-701A through E) & (PE2-19) – 5,133 cfm (for each individual vent)

If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

The tons per rolling 12-month period limitations were established by multiplying the lb/hr limitations by a maximum operating schedule of 8,760 hours per year and dividing by 2,000 lbs/ton. Therefore, provided compliance is shown with the lb/hr limitations, compliance with the rolling 12-month limitations shall also be demonstrated.

d. Emissions Limitations:

Visible particulate emissions from each individual catalyst activator furnace stack shall not exceed five percent opacity, as a six-minute average.

Visible particulate emissions from each process vent stack controlled with fabric filtration (as identified in b)(2)c.) shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

If required, compliance shall be demonstrated using Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources").

e. Emissions Limitation:

The combined VOC emissions for all HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 28.00 tons per rolling 12-month period.

Applicable Compliance Method:

The annual limitation represents the potential to emit based on a maximum production capacity of 350,000 metric tons of polyethylene resin pellets and a residual VOC in extruded pellets of less than 80 ppmv. Therefore, provided compliance is shown with the residual VOC requirement of less than 80 ppmv, compliance with the annual emission limitation shall also be demonstrated.

f. Emissions Limitation:

There shall be no visible emissions of fugitive particulate from the discharge of co-catalyst material to the atmospheric sand pit.

Applicable Compliance Method:

If required, compliance with the visible emissions limitation for the fugitive dust identified in this permit shall be determined in accordance with U.S. EPA Method 22.

g) Miscellaneous Requirements

(1) None.

6. P804, Linear Low/High-Density Polyethylene Manufacturing Unit #3

Operations, Property and/or Equipment Description:

450 KTA linear low-density polyethylene (LLDPE)/high density polyethylene (HDPE) manufacturing process; includes purification (ethylene & raw material), catalyst system, reactor system, resin degassing and vent recovery, seed bed & granular storage system, and additive handling and pelletizing.

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) None.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate matter 10 microns or less in size (PM_{10}), particulate matter 2.5 microns or less in size ($PM_{2.5}$), and carbon dioxide equivalents (CO_2e) See b)(2)a. and b)(2)b.
b.	ORC 3704.03(T)	See b)(2)c.
c.	OAC rule 3745-21-09(DD)	See b)(2)f. and b)(2)g.
d.	40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566) [In accordance with 40 CFR 60.560, this emissions unit involves equipment in the manufacturing of polyethylene subject to the requirements specified in this section.]	Combust continuous/intermittent vent emissions in a flare that meets the requirements of §60.18 [40 CFR 60.562-1(a)(1)(i)(C)] Detection and repair for equipment leaks of VOC [§60.562-2] See b)(2)f. and b)(2)g..
e.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	General Provisions [§60.1 through §60.19]
f.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999)	Closed vent system, fuel gas system, and control equipment requirements [40 CFR 63.982 through 63.988]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	[In accordance with 40 CFR 63.981, this emissions unit involves the control of air emissions from equipment leaks subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	See b)(2)f. and b)(2)g.
g.	40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550) [In accordance with 40 CFR 63.2435, this emissions unit is a miscellaneous organic chemical manufacturing process unit (MCPU) subject to the requirements specified in this section]	Reduce total organic HAP emissions from process vents by ≥ 98 % by weight by venting through closed vent system(s) to any combination of control devices or venting to a flare for process vents [§63.2455 & §63.2460]; Comply with the requirements of 40 CFR Part 63, Subpart UU for equipment leaks [§63.2480] Comply with the requirements of 40 CFR Part 63, Subpart G for process wastewater and liquid streams in open systems [§63.2485] Comply with the requirements of 40 CFR Part 63, Subpart F for heat exchange systems [§63.2490] See b)(2)f. and b)(2)g.
h.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	General Provisions [§63.1 through §63.16] Table 12 to Subpart FFFF of 40 CFR Part 63 – Applicability of General Provisions to Subpart FFFF shows which parts of the General Provisions in 40 CFR 63.1-16 apply to MCPU operations. Table 10 to 40 CFR Part 63, Subpart DDDDD – Applicability of General Provisions (Subpart A) to Subpart DDDDD shows which parts of the General Provisions in 40 CFR Part 63.1 – 63.16 apply.
i.	OAC rule 3745-21-07	See b)(2)h.
j.	OAC rule 3745-21-13	See b)(2)i.
k.	OAC rule 3745-17-11(B)	See b)(2)j.
l.	OAC rule 3745-17-07(A)	See b)(2)j.

The LLDPE/HDPE manufacturing units #3 & #4 (emissions unit P804 & P805) share seed bed operations (filter vents Y-5651 through 5655). Limitations and requirements for the shared seed bed operations are contained within the terms and conditions below and are also contained in the terms and conditions of emissions unit P805).

(2) Additional Terms and Conditions

a. BACT requirements for LLDPE/HDPE manufacturing process for VOC emissions has been determined to be the following:

i. use of thermal oxidizer (TO) achieving a destruction efficiency of 99.5% for VOC emissions (continuous) from the following:

(a) analyzer vents;

(b) degassing column vents;

(c) ethylene purification;

(d) low product purge bin vent filter; and

(e) high pressure accumulator vent

ii. use of closed vent system controlled with flare (high pressure (HP) and/or low pressure (LP)) achieving a destruction efficiency of 98% for VOC emissions (intermittent/emergency) from the following:

(a) butene dryer regen vent;

(b) hexene dryer regen vent;

(c) ICA dryer regen vent;

(d) ethylene deoxo regen vent;

(e) ethylene dryers regen vent;

(f) ethylene systems shutdown;

(g) non-emergency reactor vents; and

(h) product purge bin vent filter.

(i) pressure safety valve (PSV) leaks/releases from the following:

(i) raw materials supply pressure PSVs;

(ii) purification PSVs;

(iii) reaction PSVs;

(iv) resin degassing PSVs; and

(v) vent recovery PSVs.

iii. residual VOC in the polyethylene resin exiting the granular resin surge hopper shall be less than 80 ppmv;

iv. The combined VOC emissions for all LLDPE/HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 36.00 tons per rolling 12-month period;

v. implementation of facility specific program reducing fugitive component equipment leaks including applicable component equipment in the polyethylene manufacturing line; and

vi. implementation of a program to minimize flaring.

b. BACT requirements for LLDPE/HDPE manufacturing process for $PM_{10}/PM_{2.5}$* emissions has been determined to be the following:

i. use of fabric filtration control for achieving a maximum outlet concentration of 0.005 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) catalyst vent filter (Y-4901):

(i) 0.24 lb/hr and 0.012 ton per rolling 12-month period.

(b) receiver bin filter vent (Y-5657) & seed bed filter vents (Y-5651 through 5655):

(i) 0.08 lb/hr and 0.35 ton per rolling 12-month period.

ii. use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) granular resin surge hopper vent filter (D-6210):

(i) 0.042 lb/hr and 0.184 ton per rolling 12-month period.

(b) bag dump stations/dump hoppers vent filter (Y-6231 through 6235):

(i) 0.0515 lb/hr and 0.226 ton per rolling 12-month period.

(c) talc surge bin filter (Y-6251):

(i) 0.012 lb/hr and 0.053 ton per rolling 12-month period.

(d) mixer vent filter (Y-6260):

(i) 0.009 lb/hr and 0.039 ton per rolling 12-month period.

(e) pellet conveying hopper (PE3-07):

(i) 0.004 lb/hr and 0.018 ton per rolling 12-month period.

(f) pellet hopper (PE3-08):

(i) 0.06 lb/hr and 0.26 ton per rolling 12-month period.

(g) pellet blending/off-spec blending silos (PE3-09 through PE3-15):

(i) 0.114 lb/hr (for each individual vent) and 0.500 ton per rolling 12-month period (for each individual vent).

iii. $PM_{10}/PM_{2.5}$ emissions for the pellet dryer vent (Y-7010) shall not exceed a maximum outlet concentration of 0.002 gr/dscf and the following lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$:

(a) 0.05 lb/hr and 0.11 ton per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

iv. visible particulate emissions from each process vent stack identified in b)(2)b. shall not exceed five percent opacity, as a six-minute average.

c. BAT requirements for VOC and $PM_{10}/PM_{2.5}$ emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20. It should be noted that emissions of GHG are not subject to BAT pursuant to OAC 3745-34-31(E)(8).

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

f. The following regulations establish requirements for component equipment leak control and repair for VOC, HAPs, and greenhouse gases (GHGs) from the polyethylene manufacturing line:

i. for VOCs:

(a) OAC rule 3745-31-10 through 20;

(b) ORC 3704.03(T);

(c) OAC rule 3745-21-09(DD); and

(d) 40 CFR Part 60, Subpart DDD;

ii. for HAPs:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF;

iii. for GHGs:

(a) OAC rule 3745-31-10 through 20.

Note: A separate emissions unit (P807) associated with fugitive leaks of VOC, HAP, VHAP/Benzene*, and GHGs from all component equipment at the facility subject to the leak control and repair regulations above has been established. For efficient permitting structure applicable requirements (limitations, operational restrictions, monitoring, record keeping, reporting, and testing) associated with equipment leak control and repair for VOC, HAP, VHAP/Benzene*, and GHGs are contained within the requirements of emissions unit P807.

*It should be noted LLDPE/HDPE manufacturing operations are not subject to regulations for VHAP/Benzene emissions under 40 CFR Part 61.

g. Closed vent systems controlled with HP flare, LP flare, and thermal oxidizer control of analyzer vents, degassing column vents, ethylene purification, low product purge bin vent filter, and high-pressure accumulator vent are utilized to meet the requirements of the following regulations:

i. for VOC:

(a) OAC rule 3745-31-10 through 3745-31-20;

(b) ORC 3704.03(T); and

(c) 40 CFR Part 60, Subpart DDD.

ii. for HAP:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF.

The thermal oxidizers utilized for control and the closed vent system controlled with HP flare and LP flare are permitted as separate and individual emissions units (emissions units P001, P002, P003, and P004, respectively). For efficient permitting structure, the applicable operational restrictions, monitoring, record keeping, reporting, and testing associated with thermal oxidizer control and the closed vent systems with flare control are contained with the requirements of emissions units P001, P002, P003, and P004.

h. This emissions unit is not subject to OAC rule 3745-21-07 in accordance with OAC rule 3745-21-07(M)(3)(c).

i. This emissions unit is not subject to OAC rule 3745-21-13 in accordance with OAC rule 3745-21-13(A)(1).

j. The emission limitation specified by this rule is less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c) Operational Restrictions

(1) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(2) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(3) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall determine the VOC content in the polyethylene resin exiting the granular resin surge hopper at least once per week using Test Method 24 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources") or other method as approved by Ohio EPA.

(2) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stacks for this emissions unit identified in b)(2)b. The presence or absence of any visible emissions for each individual stack shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. whether the emissions are representative of normal operations;

c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

d. the total duration of any visible emissions incident; and

e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

(3) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(4) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(5) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the results of any testing showing the residual VOC in the polyethylene resin exiting the extruder being greater than or equal to 80 ppmv.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) The permittee shall submit semiannual written reports that identify:

a. all days during which any visible particulate emissions were observed from the stacks for this emissions unit identified in b)(2)b.; and

b. any corrective actions taken to eliminate the visible particulate emissions.

These reports shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency) by January 31 and July 31 of each year and shall cover the previous 6-month period.

(3) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(4) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(5) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

f) Testing Requirements

(1) The permittee shall conduct, or have conducted, emission testing for this emissions unit in accordance with the following requirements:

a. The emission testing shall be conducted within 180 days after initial startup of the emissions unit;

b. The emission testing shall be conducted to demonstrate compliance with:

i. the allowable emissions of 0.005 gr/dscf and 0.24 lb/hr for $PM_{10}/PM_{2.5}$ from the catalyst vent filter (Y-4901);

ii. the opacity limitation of five percent, as a six-minute average from the catalyst vent (Y-4901).

c. The following test methods shall be employed to demonstrate compliance with the allowable emission limitations:

i. For $PM_{10}/PM_{2.5}$ – Methods 1-4 of 40 CFR Part 60, Appendix A, and Methods 201, 201A, and 202 of 40 CFR Part 51, Appendix M and

ii. For opacity – Method 9 of 40 CFR, Part 60, Appendix A. Opacity readings shall be taken during the sampling runs for testing of the allowable emission limitations in f)(1)b.i. and f)(1)b.ii.

Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

d. The test(s) shall be conducted under those representative conditions that challenge to the fullest extent possible a facility's ability to meet the applicable emissions limits and/or control requirements, unless otherwise specified or approved by the appropriate Ohio EPA District Office or local air agency. Although this generally consists of operating the emissions unit at its maximum material input/production rates and results in the highest emission rate of the tested pollutant, there may be circumstances where a lower emissions loading is deemed the most challenging control scenario. Failure to test under these conditions is justification for not accepting the test results as a demonstration of compliance.

e. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the appropriate Ohio EPA District Office or local air agency. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA District Office's or local air agency's refusal to accept the results of the emission test(s).

f. Personnel from the appropriate Ohio EPA District Office or local air agency shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

g. A comprehensive written report on the results of the emissions test(s) shall be signed by the person or persons responsible for the tests and submitted to the appropriate Ohio EPA District Office or local air agency within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the appropriate Ohio EPA District Office or local air agency.

(2) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

i. Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)b.;

ii. Reduce emissions from analyzer vents, degassing column vents, ethylene purification, low product purge bin vent filter, and high-pressure accumulator vent with a thermal oxidizer achieving a VOC destruction efficiency of 99.5%;

iii. Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Refer to emissions unit P001, P002, P003, P004 and P807 for applicable compliance methods for the above emission limitations.

b. Emissions Limitations:

i. $PM_{10}/PM_{2.5}$ emission limitations of 0.005 gr/dscf and lb/hr and tons per rolling 12-month period limitations indicated for the following process vents:

(a) catalyst vent filter (Y-4901):

(i) 0.24 lb/hr and 0.012 ton per rolling 12-month period.

(b) receiver bin filter vent* (Y-5657) & seed bed filter vents* (Y-5651 through 5655):

(i) 0.08 lb/hr and 0.35 ton per rolling 12-month period.

*Based on process design, there will only be air flow in one of the 6 filter vents at any time.

ii. $PM_{10}/PM_{2.5}$ emission limitations of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) granular resin surge hopper/vent filter (D-6210):

(i) 0.042 lb/hr and 0.184 ton per rolling 12-month period.

(b) bag dump stations/dump hoppers vent filters** (Y-6231 through 6235):

(i) 0.0515 lb/hr and 0.226 ton per rolling 12-month period.

**Based on process design, there will only be air flow in one of the 5 filter vents at any time.

(c) talc surge bin filter (Y-6251):

(i) 0.012 lb/hr and 0.053 ton per rolling 12-month period.

(d) mixer vent filter (Y-6260):

(i) 0.009 lb/hr and 0.039 ton per rolling 12-month period.

(e) pellet conveying hopper (PE3-07):

(i) 0.004 lb/hr and 0.018 ton per rolling 12-month period.

(f) pellet hopper (PE3-08):

(i) 0.06 lb/hr and 0.26 ton per rolling 12-month period.

(g) pellet blending/off-spec blending silos*** (PE3-09 through PE3-15):

(i) 0.114 lb/hr (for each individual vent) and 0.500 ton per rolling 12-month period (for each individual vent).

***Based on process design, only 2 of the 7 silos will be in operation at any time.

(h) pellet dryer vent (Y-7010):

(i) 0.05 lb/hr & 0.11 ton per rolling 12-month period.

Applicable Compliance Method:

The 0.005 gr/dscf (for sources upstream of the pellet dryer) and 0.002 gr/dscf (for pellet dryer and sources downstream of the pellet dryer) were established in accordance with BACT requirements as maximum outlet concentration standards.

The lb/hr limitations were established by multiplying the emission limitation of 0.005 gr/dscf or 0.002 gr/dscf by the following maximum volumetric air flow rates (cfm) and multiplying by lb/7,000 gr and 60 min/hr:

catalyst vent filter (Y-4901) – 5,600 cfm

receiver bin filter vent (Y-5657) & seed bed filter vents (Y-5651 through 5655) – 1,867 cfm (for an individual vent) granular resin surge hopper/vent filter (D-6210) – 2450 cfm

bag dump stations/dump hoppers vent filter (Y-6231 through 6235) – 6008 cfm (for an individual vent) talc surge bin filter (Y-6251) – 700 cfm

mixer vent filter (Y-6260) – 525 cfm

pellet conveying hopper (PE3-07) – 233 cfm

pellet hopper (PE3-08) – 3500 cfm

pellet blending/off-spec blending silos (PE3-09 through PE3-15) – 6650 cfm (for an individual vent)

pellet dryer vent (Y-7010) – 583 cfm

If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

The tons per rolling 12-month period limitations were established by multiplying the lb/hr limitations by a maximum operating schedule of 100 hours per year for the catalyst vent filter and 8,760 hours per year for all other identified vents and dividing by 2,000 lbs/ton. Therefore, provided compliance is shown with the lb/hr limitations, compliance with the rolling 12-month limitations shall also be demonstrated.

c. Emissions Limitations:

Visible particulate emissions from each process vent stack identified in b)(2)b. shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

If required, compliance shall be demonstrated using Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources").

d. Emissions Limitation:

The combined VOC emissions for all LLDPE/HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 36.00 tons per rolling 12-month period.

Applicable Compliance Method:

The annual limitation represents the potential to emit based on a maximum production capacity of 450,000 metric tons of polyethylene resin pellets and a residual VOC in extruded pellets of less than 80 ppmv. Therefore, provided compliance is shown with the residual VOC requirement of less than 80 ppmv, compliance with the annual emission limitation shall also be demonstrated.

g) Miscellaneous Requirements

(1) None.

7. P805, Linear Low/High-Density Polyethylene Manufacturing Unit #4

Operations, Property and/or Equipment Description:

450 KTA linear low-density polyethylene (LLDPE)/high density polyethylene (HDPE) manufacturing process; includes purification (ethylene & raw material), catalyst system, reactor system, resin degassing and vent recovery, seed bed & granular storage system, and additive handling and pelletizing.

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) None.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate matter 10 microns or less in size (PM_{10}), particulate matter 2.5 microns or less in size ($PM_{2.5}$), and carbon dioxide equivalents (CO_2e) See b)(2)a. and b)(2)b.
b.	ORC 3704.03(T)	See b)(2)c.
c.	OAC rule 3745-21-09(DD)	See b)(2)f. and b)(2)g.
d.	40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566) [In accordance with 40 CFR 60.560, this emissions unit involves equipment in the manufacturing of polyethylene subject to the requirements specified in this section.]	Combust continuous/intermittent vent emissions in a flare that meets the requirements of §60.18 [40 CFR 60.562-1(a)(1)(i)(C)] Detection and repair for equipment leaks of VOC [§60.562-2] See b)(2)f. and b)(2)g..
e.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	General Provisions [§60.1 through §60.19]
f.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999)	Closed vent system, fuel gas system, and control equipment requirements [40 CFR 63.982 through 63.988]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	[In accordance with 40 CFR 63.981, this emissions unit involves the control of air emissions from equipment leaks subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	See b)(2)f. and b)(2)g.
g.	40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550) [In accordance with 40 CFR 63.2435, this emissions unit is a miscellaneous organic chemical manufacturing process unit (MCPU) subject to the requirements specified in this section]	Reduce total organic HAP emissions from process vents by ≥ 98 % by weight by venting through closed vent system(s) to any combination of control devices or venting to a flare for process vents [§63.2455 & §63.2460]; Comply with the requirements of 40 CFR Part 63, Subpart UU for equipment leaks [§63.2480] Comply with the requirements of 40 CFR Part 63, Subpart G for process wastewater and liquid streams in open systems [§63.2485] Comply with the requirements of 40 CFR Part 63, Subpart F for heat exchange systems [§63.2490] See b)(2)f. and b)(2)g.
h.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	General Provisions [§63.1 through §63.16] Table 12 to Subpart FFFF of 40 CFR Part 63 – Applicability of General Provisions to Subpart FFFF shows which parts of the General Provisions in 40 CFR 63.1-16 apply to MCPU operations. Table 10 to 40 CFR Part 63, Subpart DDDDD – Applicability of General Provisions (Subpart A) to Subpart DDDDD shows which parts of the General Provisions in 40 CFR Part 63.1 – 63.16 apply.
i.	OAC rule 3745-21-07	See b)(2)h.
j.	OAC rule 3745-21-13	See b)(2)i.
k.	OAC rule 3745-17-11(B)	See b)(2)j.
l.	OAC rule 3745-17-07(A)	See b)(2)j.

The LLDPE/HDPE manufacturing units #3 & #4 (emissions unit P804 & P805) share seed bed operations (filter vents Y-5651 through 5655). Limitations and requirements for the shared seed bed operations are contained within the terms and conditions below and are also contained in the terms and conditions of emissions unit P804).

(2) Additional Terms and Conditions

a. BACT requirements for LLDPE/HDPE manufacturing process for VOC emissions has been determined to be the following:

i. use of thermal oxidizer (TO) achieving a destruction efficiency of 99.5% for VOC emissions (continuous) from the following:

(a) analyzer vents;

(b) degassing column vents;

(c) ethylene purification;

(d) low product purge bin vent filter; and

(e) high pressure accumulator vent

ii. use of closed vent system controlled with flare (high pressure (HP) and/or low pressure (LP)) achieving a destruction efficiency of 98% for VOC emissions (intermittent/emergency) from the following:

(a) butene dryer regen vent;

(b) hexene dryer regen vent;

(c) ICA dryer regen vent;

(d) ethylene deoxo regen vent;

(e) ethylene dryers regen vent;

(f) ethylene systems shutdown;

(g) non-emergency reactor vents; and

(h) product purge bin vent filter.

(i) pressure safety valve (PSV) leaks/releases from the following:

(i) raw materials supply pressure PSVs;

(ii) purification PSVs;

(iii) reaction PSVs;

(iv) resin degassing PSVs; and

(v) vent recovery PSVs.

iii. residual VOC in the polyethylene resin exiting the granular resin surge hopper shall be less than 80 ppmv;

iv. The combined VOC emissions for all LLDPE/HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 36.00 tons per rolling 12-month period;

v. implementation of facility specific program reducing fugitive component equipment leaks including applicable component equipment in the polyethylene manufacturing line; and

vi. implementation of a program to minimize flaring.

b. BACT requirements for LLDPE/HDPE manufacturing process for $PM_{10}/PM_{2.5}$* emissions has been determined to be the following:

i. use of fabric filtration control for achieving a maximum outlet concentration of 0.005 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) catalyst vent filter (Y-4902):

(i) 0.24 lb/hr and 0.012 ton per rolling 12-month period.

(b) receiver bin filter vent (Y-5957) & seed bed filter vents (Y-5651 through 5655):

(i) 0.08 lb/hr and 0.35 ton per rolling 12-month period.

ii. use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) granular resin surge hopper/vent filter (D-6510):

(i) 0.042 lb/hr and 0.184 ton per rolling 12-month period.

(b) bag dump stations/dump hoppers vent filter (Y-6531 through 6535):

(i) 0.0515 lb/hr and 0.226 ton per rolling 12-month period.

(c) talc surge bin filter (Y-6551):

(i) 0.012 lb/hr and 0.053 ton per rolling 12-month period.

(d) mixer vent filter (Y-6560):

(i) 0.009 lb/hr and 0.039 ton per rolling 12-month period.

(e) pellet conveying hopper (PE4-07):

(i) 0.004 lb/hr and 0.018 ton per rolling 12-month period.

(f) pellet hopper (PE4-08):

(i) 0.06 lb/hr and 0.26 ton per rolling 12-month period.

(g) pellet blending/off-spec blending silos (PE4-09 through PE4-15):

(i) 0.114 lb/hr (for each individual vent) and 0.500 ton per rolling 12-month period (for each individual vent).

iii. $PM_{10}/PM_{2.5}$ emissions for the pellet dryer vent (Y-7310) shall not exceed a maximum outlet concentration of 0.002 gr/dscf and the following lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$:

(a) 0.05 lb/hr and 0.11 ton per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

iv. visible particulate emissions from each process vent stack identified in b)(2)b. shall not exceed five percent opacity, as a six-minute average.

c. BAT requirements for VOC and $PM_{10}/PM_{2.5}$ emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20. It should be noted that emissions of GHG are not subject to BAT pursuant to OAC 3745-34-31(E)(8).

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

f. The following regulations establish requirements for component equipment leak control and repair for VOC, HAPs, and greenhouse gases (GHGs) from the polyethylene manufacturing line:

i. for VOCs:

(a) OAC rule 3745-31-10 through 20;

(b) ORC 3704.03(T);

(c) OAC rule 3745-21-09(DD); and

(d) 40 CFR Part 60, Subpart DDD;

ii. for HAPs:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF;

iii. for GHGs:

(a) OAC rule 3745-31-10 through 20.

Note: A separate emissions unit (P807) associated with fugitive leaks of VOC, HAP, VHAP/Benzene*, and GHGs from all component equipment at the facility subject to the leak control and repair regulations above has been established. For efficient permitting structure applicable requirements (limitations, operational restrictions, monitoring, record keeping, reporting, and testing) associated with equipment leak control and repair for VOC, HAP, VHAP/Benzene*, and GHGs are contained within the requirements of emissions unit P807.

*It should be noted LLDPE/HDPE manufacturing operations are not subject to regulations for VHAP/Benzene emissions under 40 CFR Part 61.

g. Closed vent systems controlled with HP flare, LP flare, and thermal oxidizer control of analyzer vents, degassing column vents, ethylene purification, low product purge bin vent filter, and high-pressure accumulator vent are utilized to meet the requirements of the following regulations:

i. for VOC:

(a) OAC rule 3745-31-10 through 3745-31-20;

(b) ORC 3704.03(T); and

(c) 40 CFR Part 60, Subpart DDD.

ii. for HAP:

(a) 40 CFR Part 63, Subpart SS; and

(b) 40 CFR Part 63, Subpart FFFF.

The thermal oxidizers utilized for control and the closed vent system controlled with HP flare and LP flare are permitted as separate and individual emissions units (emissions units P001, P002, P003, and P004, respectively). For efficient permitting structure, the applicable operational restrictions, monitoring, record keeping, reporting, and testing associated with thermal oxidizer control and the closed vent systems with flare control are contained with the requirements of emissions units P001, P002, P003, and P004.

h. This emissions unit is not subject to OAC rule 3745-21-07 in accordance with OAC rule 3745-21-07(M)(3)(c).

i. This emissions unit is not subject to OAC rule 3745-21-13 in accordance with OAC rule 3745-21-13(A)(1).

j. The emission limitation specified by this rule is less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c) Operational Restrictions

(1) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(2) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(3) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall determine the VOC content in the polyethylene resin exiting the granular resin surge hopper at least once per week using Test Method 24 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources") or other method as approved by Ohio EPA.

(2) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stacks for this emissions unit identified in b)(2)b. The presence or absence of any visible emissions for each individual stack shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. whether the emissions are representative of normal operations;

c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

d. the total duration of any visible emissions incident; and

e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions or specify the corrective actions that were taken to eliminate abnormal visible emissions.

(3) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(4) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(5) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the results of any testing showing the residual VOC in the polyethylene resin exiting the extruder being greater than or equal to 80 ppmv.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) The permittee shall submit semiannual written reports that identify:

a. all days during which any visible particulate emissions were observed from the stacks for this emissions unit identified in b)(2)b.; and

b. any corrective actions taken to eliminate the visible particulate emissions.

These reports shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency) by January 31 and July 31 of each year and shall cover the previous 6-month period.

(3) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(4) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(5) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

i. Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)b.;

ii. Reduce emissions from analyzer vents, degassing column vents, ethylene purification, low product purge bin vent filter, and high-pressure accumulator vent with a thermal oxidizer achieving a VOC destruction efficiency of 99.5%;

iii. Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Refer to emissions unit P001, P002, P003, P004 and P807 for applicable compliance methods for the above emission limitations.

b. Emissions Limitations:

i. $PM_{10}/PM_{2.5}$ emission limitations of 0.005 gr/dscf and lb/hr and tons per rolling 12-month period limitations indicated for the following process vents:

(a) catalyst vent filter (Y-4902):

(i) 0.24 lb/hr and 0.012 ton per rolling 12-month period.

(b) receiver bin filter vent* (Y-5957) & seed bed filter vents* (Y-5651 through 5655):

(i) 0.08 lb/hr and 0.35 ton per rolling 12-month period.

*Based on process design, there will only be air flow in one of the 6 filter vents at any time.

ii. $PM_{10}/PM_{2.5}$ emission limitations of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for $PM_{10}/PM_{2.5}$ for the following process vents:

(a) granular resin surge hopper/vent filter (D-6510):

(i) 0.042 lb/hr and 0.184 ton per rolling 12-month period.

(b) bag dump stations/dump hoppers vent filters** (Y-6531 through 6535):

(i) 0.0515 lb/hr and 0.226 ton per rolling 12-month period.

**Based on process design, there will only be air flow in one of the 5 filter vents at any time.

(c) talc surge bin filter (Y-6551):

(i) 0.012 lb/hr and 0.053 ton per rolling 12-month period.

(d) mixer vent filter (Y-6560):

(i) 0.009 lb/hr and 0.039 ton per rolling 12-month period.

(e) pellet conveying hopper (PE4-07):

(i) 0.004 lb/hr and 0.018 ton per rolling 12-month period.

(f) pellet hopper (PE4-08):

(i) 0.06 lb/hr and 0.26 ton per rolling 12-month period.

(g) pellet blending/off-spec blending silos*** (PE4-09 through PE4-15):

(i) 0.114 lb/hr (for each individual vent) and 0.500 ton per rolling 12-month period (for each individual vent).

***Based on process design, only 2 of the 7 silos will be in operation at any time.

(h) pellet dryer vent (Y-7310):

(i) 0.05 lb/hr & 0.11 ton per rolling 12-month period.

Applicable Compliance Method:

The 0.005 gr/dscf (for sources upstream of the pellet dryer) and 0.002 gr/dscf (for pellet dryer and sources downstream of pellet dryer) were established in accordance with BACT requirements as the maximum outlet concentration standard for the application of fabric filtration control.

The lb/hr limitations were established by multiplying the emission limitation of 0.005 gr/dscf or 0.002 gr/dscf by the following maximum volumetric air flow rates (cfm) and multiplying by lb/7,000 gr and 60 min/hr:

catalyst vent filter (Y-4902) – 5,600 cfm

receiver bin filter vent (Y-5957) & seed bed filter vents (Y-5651 through 5655) – 1,867 cfm (for an individual vent)

granular resin surge hopper/vent filter (D-6510) – 2450 cfm

bag dump stations/dump hoppers vent filter (Y-6531 through 6535) – 6008 cfm (for an individual vent)

talc surge bin filter (Y-6551) – 700 cfm

mixer vent filter (Y-6560) – 525 cfm

pellet conveying hopper (PE4-07) – 233 cfm

pellet hopper (PE4-08) – 3500 cfm

pellet blending/off-spec blending silos (PE4-09 through PE4-15) – 6650 cfm (for an individual vent)

pellet dryer vent (Y-7310) – 583 cfm

If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

The tons per rolling 12-month period limitations were established by multiplying the lb/hr limitations by a maximum operating schedule of 100 hours per year for the catalyst vent filter and 8,760 hours per year for all other identified vents and dividing by 2,000 lbs/ton. Therefore, provided compliance is shown with the lb/hr limitations, compliance with the rolling 12-month limitations shall also be demonstrated.

c. Emissions Limitations:

Visible particulate emissions from each process vent stack identified in b)(2)b. shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

If required, compliance shall be demonstrated using Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources").

d. Emissions Limitation:

The combined VOC emissions for all LLDPE/HDPE manufacturing process vents without VOC control (e.g. not vented to flare or TO) shall not exceed 36.00 tons per rolling 12-month period.

Applicable Compliance Method:

The annual limitation represents the potential to emit based on a maximum production capacity of 450,000 metric tons of polyethylene resin pellets and a residual VOC in extruded pellets of less than 80 ppmv. Therefore, provided compliance is shown with the residual VOC requirement of less than 80 ppmv, compliance with the annual emission limitation shall also be demonstrated.

g) Miscellaneous Requirements

(1) None.

8. Emissions Unit Group – OSBL Thermal Oxidizers: P001 and P002

EU ID	Operations, Property and/or Equipment Description
P001	OSBL Thermal Oxidizer 1 (B-5002A); 6.2 MMBtu/hr thermal oxidizer
P002	OSBL Thermal Oxidizer 2 (B-5002B); 6.2 MMBtu/hr thermal oxidizer

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)c., b)(2)e. and b)(2)f.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC); particulate matter 10 microns or less in size (PM_{10}) and particulate matter 2.5 microns or less in size ($PM_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO_x), and carbon dioxide equivalents (CO_2e). See b)(2)b.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)c. and b)(2)d.
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)e. and b)(2)f.
d.	40 CFR Part 60, Subpart Kb (40 CFR Part 60.110b – 60.117b) This emissions unit is used to meet the control requirements specified in this section]	See b)(2)g.
e.	40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566) [This emissions unit is used to meet the control requirements specified in this section]	Control device monitoring, record keeping, and reporting [40 CFR 60.562-1, 60.563 through 60.565] See c)(1), d)(4) and e)(3).
f.	40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668)	Control device monitoring, record keeping, reporting, and testing [40 CFR 60.660 through 60.668]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	[This emissions unit is used to meet the control requirements specified in this section]	See c)(2), d)(5), and e)(4).
g.	40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708) [This emissions unit is used to meet the control requirements specified in this section]	Control device monitoring, record keeping, reporting, and testing [40 CFR 60.700 through 60.708] See c)(3), d)(6) and e)(5).
h.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	Control device and work practice requirements [§60.18] All of the General Provisions of 40 CFR Part 60, Subpart A are applicable except for the following: §60.7(c) does not apply to 40 CFR Subpart NNN [§60.665(k)]; and §60.7(c) does not apply to 40 CFR Subpart RRR [§60.705(k)]
i.	40 CFR Part 63, Subpart G (40 CFR 63.110 – 63.153) [This emissions unit is used to meet the control requirements specified in this section]	Combustion device requirements [40 CFR 63.110 – 63.153] See c)(4), d)(7) and e)(6).
j.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) This emissions unit is used to meet the control requirements specified in 40 CFR Part 63, Subpart YY and 40 CFR Part 63, Subpart FFFF and is referenced for use by the above subparts]	Control device requirements [40 CFR 63.980 – 63.999] See c)(5), d)(8) and e)(7).
k.	40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114) [This emissions unit is used to meet the control requirements specified in this section]	Control device requirements [40 CFR 63.1100 – 63.1114] See c)(6), d)(9) and e)(8).
l.	40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550) [This emissions unit is used to meet the control requirements specified in	Requirements for control devices [40 CFR 63.2430 – 63.2550] See c)(7), d)(10) and e)(9).

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	this section]	
m.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	Control device and work practice requirements [§630.11]
n.	OAC rule 3745-17-11(B)	See b)(2)h.
o.	OAC rule 3745-17-07(A)	See b)(2)i.

(2) Additional Terms and Conditions

a. Thermal oxidizer control is used to meet control requirements associated with BACT, New Source Performance Standards (NSPS), BAT, Maximum Achievable Control Technology, and National Emission Standards for Hazardous Air Pollutants for affected facility operations, storage tanks, and process vents. For efficient permitting structure, the thermal oxidizer has been permitted as a separate and individual emissions unit to contain limitations, operational restrictions, monitoring, record keeping, reporting, and testing associated with control requirements.

It should be noted that the thermal oxidizer control system consists of two identical thermal oxidizers (P001 and P002). One thermal oxidizer will be operational and providing required control at all times while the other unit is ready for use as a backup.

b. BACT requirements for the thermal oxidizer have been determined to be the following:

i. designed and operated to meet a 99.5% destruction efficiency for VOC.

ii. visible particulate emissions from the thermal oxidizer stack shall not exceed five percent opacity, as a six-minute average.

iii. Thermal oxidizer emissions shall not exceed the following:

(a) CO – 0.51 lb/hr and 2.22 tons per rolling 12-month period;

(b) NO_x – 0.61 lb/hr and 2.67 tons per rolling 12-month period;

(c) $PM_{10}/PM_{2.5}$* - 0.05 lb/hr and 0.20 ton per rolling 12-month period;

(d) VOC – 0.03 lbs/hr and 0.14 ton per rolling 12-month period; and

(e) CO_2e – 3,161 tons per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

c. BAT requirements under OAC rule 3745-31-05(A)(3) have been determined to be:

i. for VOC, CO, NOx, and $PM_{10}/PM_{2.5}$ – compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

ii. emissions of sulfur dioxide are negligible and are not addressed by BAT requirements in this permit.

iii. emissions of greenhouse gas (CO_2e) are not subject to BAT requirements pursuant to OAC 3745-34-31(E)(8).

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of NO_x, VOC, and $PM_{10}/PM_{2.5}$ from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable).

f. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

g. The thermal oxidizer is subject to the control device requirements contained in 40 CFR Part 60, Subpart Kb. The control device requirements specified by this rule are equivalent to or less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

h. The uncontrolled mass rate of particulate emissions from the thermal oxidizer is less than 10 pounds per hour. Therefore, pursuant to OAC rule 3745-17-11(A)(2)(a)(ii), Figure II of OAC rule 3745-17-11 does not apply. In addition, Table I of OAC rule 3745-17-11 does not apply because of the location in Belmont County.

i. The emissions from the thermal oxidizer are exempt from the visible particulate emission limitations specified in OAC rule 3745-17-07(A), pursuant to OAC rule 3745-17-07(A)(3)(h), because the emissions unit is not subject to the requirements of OAC rule 3745-17-11.

c) Operational Restrictions

(1) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(2) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668)

(3) See 40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708)

(4) See 40 CFR Part 63, Subpart G (40 CFR 63.110-153).

(5) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(6) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

(7) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

d) Monitoring and/or Recordkeeping Requirements

(1) In order to maintain compliance with the applicable emission limitation(s) contained in this permit, the acceptable average combustion temperature within the thermal oxidizer, for any 3-hour block of time when process and/or storage tank emissions are vented to the thermal oxidizer, shall not be below the average temperature measured during the most recent performance test that demonstrated compliance. Until compliance testing has been conducted, the thermal oxidizer shall be operated and maintained in accordance with the manufacturer's recommendations, instructions, and the operating manual.

(2) The permittee shall properly install, operate, and maintain a continuous temperature monitor and recorder that measures and records the combustion temperature within the thermal oxidizer when process and/or storage tank emissions are vented to the thermal oxidizer, including periods of startup and shutdown. Units shall be in degrees Fahrenheit. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within $\pm$ 1 percent of the temperature being measured or $\pm$ 5 degrees Fahrenheit, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and the operating manuals, with any modifications deemed necessary by the permittee. The acceptable temperature setting shall be based upon the manufacturer's specifications until such time as any required performance testing is conducted and the appropriate temperature range is established to demonstrate compliance. Following compliance testing, the permittee shall collect and record the following information each day the thermal oxidizer is utilized for control:

a. all 3-hour blocks of time, when process and/or storage tank emissions are vented to the thermal oxidizer, during which the average combustion temperature within the thermal oxidizer was below the average temperature measured during the most recent performance test that demonstrated compliance; and

b. a log or record of the operating time for the capture (collection) system, thermal oxidizer, monitoring equipment, and associated emissions unit(s).

These records shall be maintained at the facility for a period of five years.

(3) Whenever the monitored average combustion temperature within the thermal oxidizer deviates from the range or limit established in accordance with this permit, the permittee shall promptly investigate the cause of the deviation. The permittee shall maintain records of the following information for each investigation:

a. the date and time the deviation began;

b. the magnitude of the deviation at that time;

c. the date the investigation was conducted;

d. the name(s) of the personnel who conducted the investigation; and

e. the findings and recommendations.

In response to each required investigation to determine the cause of a deviation, the permittee shall take prompt corrective action to bring the operation of the control equipment within the acceptable range/limit specified in this permit, unless the permittee determines that corrective action is not necessary and documents the reasons for that determination and the date and time the deviation ended. The permittee shall maintain records of the following information for each corrective action taken:

f. a description of the corrective action;

g. the date corrective action was completed;

h. the date and time the deviation ended;

i. the total period of time (in minutes) during which there was a deviation;

j. the temperature readings immediately after the corrective action was implemented; and

k. the name(s) of the personnel who performed the work.

Investigation and records required by this paragraph do not eliminate the need to comply with the requirements of OAC rule 3745-15-06 if it is determined that a malfunction has occurred.

(4) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(5) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668)

(6) See 40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708)

(7) See 40 CFR Part 63, Subpart G (40 CFR 63.110-153).

(8) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(9) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

(10) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

e) Reporting Requirements

(1) The permittee shall submit quarterly summaries of the following records:

a. all 3-hour blocks of time (when process and/or storage tank emissions are vented to the thermal oxidizer) during which the average combustion temperature within the thermal oxidizer was below the average temperature maintained during the most recent performance test that demonstrated compliance;

b. any records of downtime (date and length of time) for the capture (collection) system, the thermal oxidizer, and/or the monitoring equipment when process and/or storage tank emissions are vented to the thermal oxidizer; and

c. a log of the operating time for the capture system, thermal oxidizer, monitoring equipment, and when process and/or storage tank emissions are vented to the thermal oxidizer.

These quarterly reports shall be submitted by April 30, July 31, October 31, and January 31, and shall cover the records for the previous calendar quarters.

(2) See 40 CFR Part 60, Subpart DDD (40 CFR Part 60.560 – 60.566).

(3) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668)

(4) See 40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708)

(5) See 40 CFR Part 63, Subpart G (40 CFR 63.110-153).

(6) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(7) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

(8) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

f) Testing Requirements

(1) The permittee shall conduct, or have conducted, emission testing for one of the two thermal oxidizers in accordance with the following requirements:

a. Emissions testing involving VOC shall be performed within 60 days of achieving the maximum production rate for affected facility controlled by the thermal oxidizer, but not later than 180 days after initial startup. All other emission testing shall be conducted within 180 days after initial startup of the emissions unit.

b. The emission testing shall be conducted to demonstrate compliance with:

i. NO_x – 0.61 lb/hr;

ii. CO – 0.51 lb/hr;

iii. VOC – 0.03 lbs/hr;

iv. $PM_{10}/PM_{2.5}$ - 0.05 lb/hr;

v. the opacity limitation of five percent, as a six-minute average from the thermal oxidizer stack;

vi. the destruction efficiency of $\geq$ 99.5% for VOCs; and

vii. the reduction of total organic HAPs by 98 wt%.

c. The following test methods shall be employed to demonstrate compliance with the allowable emission limitations:

i. for NOx – Methods 1 - 4 and 7 of 40 CFR Part 60, Appendix A;

ii. for CO – Methods 1 - 4 and 10 of 40 CFR Part 60, Appendix A;

iii. for VOC – Methods 1 - 4 and 18 and 25, as applicable, of 40 CFR Part 60 Appendix A;

iv. for $PM_{10}/PM_{2.5}$ – Methods 1-4 of 40 CFR Part 60, Appendix A, and Methods 201, 201A, and 202 of 40 CFR Part 51, Appendix M and

v. for opacity – Method 9 of 40 CFR, Part 60, Appendix A. Opacity readings shall be taken during the sampling runs for testing of the allowable emission limitations in f)(1)b.i. and f)(1)b.ii.

vi. the destruction efficiency (i.e. the percent reduction in mass emissions between the inlet and outlet of the control system) shall be determined in accordance with the test methods and procedures specified in 3745-21-10(C)(3), or an alternative test protocol approved by the Ohio EPA. The test methods and procedures selected shall be based on a consideration of the diversity of the organic species present and their total concentration, and on a consideration of the potential presence of interfering gases.

vii. the reduction of total organic HAPs shall be determined in accordance with the test methods and procedures specified in 40 CFR 63.116(c), 40 CFR 63.997, 40 CFR 61.355, 40 CFR Part 63, Subpart FFFF, and 40 CFR Part 63, Subpart YY* or an alternative test protocol approved by the Ohio EPA or U.S. EPA.

*Overlap provisions with other regulations within in the subpart may be applied.

Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA. Alternatives of test methods and procedures may involve approval from U.S. EPA based on the delegation of authority outlined within specific regulations.

d. During the emissions testing, the emissions unit shall be operated under operational conditions approved in advance by the appropriate Ohio EPA District Office or local air agency. Operational conditions that may need to be approved include, but are not limited to, the production rate, the type of material processed, material make-up (solvent content, etc.), or control equipment operational limitations (burner temperature, precipitator voltage, etc.). In general, testing shall be done under “worst case” conditions expected during the life of the permit. As part of the information provided in the “Intent to Test” notification form described below, the permittee shall provide a description of the emissions unit operational conditions they will meet during the emissions testing and describe

why they believe "worst case" operating conditions will be met. Prior to conducting the test(s), the permittee shall confirm with the appropriate Ohio EPA District Office or local air agency that the proposed operating conditions constitute "worst case". Failure to test under the approved conditions may result in Ohio EPA not accepting the test results as a demonstration of compliance.

e. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the appropriate Ohio EPA District Office or local air agency. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA District Office's or local air agency's refusal to accept the results of the emission test(s).

f. Personnel from the appropriate Ohio EPA District Office or local air agency shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

g. A comprehensive written report on the results of the emissions test(s) shall be signed by the person or persons responsible for the tests and submitted to the appropriate Ohio EPA District Office or local air agency within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the appropriate Ohio EPA District Office or local air agency.

(2) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

i. Short-term emissions shall not exceed:

(a) NO_x – 0.61 lb/hr;

(b) CO – 0.51 lb/hr;

(c) VOC – 0.03 lbs/hr;

(d) $PM_{10}/PM_{2.5}$ - 0.05 lb/hr;

(e) Opacity - visible particulate emissions from the catalytic combustion unit stack shall not exceed five percent opacity, as a six-minute average; and

(f) Control requirements - the destruction efficiency of $\geq$ 99.5% for VOCs and the reduction of total organic HAPs by 98 wt%.

Applicable Compliance Method:

Compliance with the short-term emission limitations during normal operations shall be demonstrated based on the testing requirements in f)(1).

ii. Annual emissions shall not exceed:

Applicable Compliance Method:

(a) CO – 2.22 tons per rolling 12-month period;

(b) NO_x – 2.67 tons per rolling 12-month period;

(c) $PM_{10}/PM_{2.5}$ - 0.20 ton per rolling 12-month period; and

(d) VOC – 0.14 ton per rolling 12-month period.

Applicable Compliance Method:

The annual emission limitations were developed by multiplying the short-term allowable emission limitations in lb/hr, by the maximum annual hours of operation (8,760 hours), and then dividing by 2,000 lbs/ton. Therefore, if compliance is shown with the short-term limitations, compliance shall also be shown with the annual emission limitations.

(e) CO_2e – 3177 tons per rolling 12-month period.

Applicable Compliance Method:

Compliance with the annual emission limitations is demonstrated based upon the following calculation:

$$M_p = EF_p \left(\frac{6.2\ \text{MMBtu}}{\text{hr}}\right)\left(\frac{8{,}760\ \text{hrs}}{12\ \text{months}}\right)\left(\frac{1\ \text{ton}}{2{,}000\ \text{lbs}}\right)$$

Where:

Mp = maximum annual emissions of CO_2e in tons per rolling 12-month period;

EF_p= emission factor of 116.98 lbs CO_2e/MMBtu:

CO_2e = 1168.98 lbs CO_2e/MMBtu is based on emissions of carbon dioxide (CO_2), methane (CH_4), and nitrogen dioxide (N_2O) adjusted for global warming potentials. CO_2 and CH_4 emissions based on factors from 40 CFR 98, Tables C-1 & C-2. N_2O emissions based on factors from 40 CFR 98, Table C-2;

6.2 MMBtu/hr = maximum heat input for thermal oxidizer based on the composition of inlet stream to the thermal oxidizer and an inlet stream feed rate; and

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period.

g) Miscellaneous Requirements

(1) None.

9. P003, High Pressure Ground Flare (B-5001)

Operations, Property and/or Equipment Description:

1.8 MMBtu/hr high-pressure, multi-point, staged ground flare

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)c., b)(2)e. and b)(2)f.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate matter 10 microns or less in size (PM_{10}), particulate matter 2.5 microns or less in size ($PM_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO_x) and carbon dioxide equivalents (CO_2e). See b)(2)b.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)c. and b)(2)d.
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)e. and b)(2)f.
d.	OAC rule 3745-21-09(DD)	See b)(2)g.
e.	40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668) [This emissions unit is used to meet the control requirements specified in this section]	Flare requirements, monitoring, reporting and testing [40 CFR 60.660 through 60.668] See c)(5), d)(3) and e)(3).
f.	40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708) [This emissions unit is used to meet the control requirements specified in this section]	Flare requirements, monitoring, testing, and reporting [40 CFR 60.700 through 60.708] See c)(6), d)(4) and e)(4).
g.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	All of the General Provisions of 40 CFR Part 60, Subpart A are applicable except

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		for the following: §60.7(c) does not apply to 40 CFR Subpart NNN [§60.665(k)]; and §60.7(c) does not apply to 40 CFR Subpart RRR [§60.705(k)]
h.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) This emissions unit is used to meet the control requirements specified in 40 CFR Part 63, Subpart YY and is referenced for use by the above subpart]	Closed vent system and flare requirements [40 CFR 63.980 – 63.999] See c)(7), d)(5) and e)(5).
i.	40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114) [This emissions unit is used to meet the control requirements specified in this section]	Flare requirements [40 CFR 63.1100 – 63.1114] See c)(8), d)(6) and e)(6).
j.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	General Provisions [§63.1 through §60.16]

(2) Additional Terms and Conditions

a. The high pressure (HP) ground flare is used to meet control requirements associated with BACT, New Source Performance Standards (NSPS), BAT, and Maximum Achievable Control Technology for affected facility operations and process vents. For efficient permitting structure, the HP ground flare has been permitted as a separate and individual emissions unit to contain limitations, operational restrictions, monitoring, record keeping, reporting, and testing associated with control requirements.

b. BACT requirements for the HP ground flare have been determined to be the following:

i. designed and operated to meet a 98% destruction efficiency for VOC.

ii. no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

iii. flaring emissions (normal operations) shall not exceed the following:

(a) CO – 2.9171 tons per rolling 12-month period;

(b) NO_x – 0.536 ton per rolling 12-month period;

(c) $PM_{10}/PM_{2.5}$* - 0.059 ton per rolling 12-month period;

(d) VOC – 4.494 tons per rolling 12-month period; and

(e) CO2e – 923. tons per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

c. BAT requirements under OAC rule 3745-31-05(A)(3) have been determined to be:

i. for NOx, CO, VOC, and $PM_{10}/PM_{2.5}$ – compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

ii. emissions of sulfur dioxide are negligible and are not addressed by BAT requirements in this permit.

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of NO_x, CO, VOC, and $PM_{10}/PM_{2.5}$ from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable).

f. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

g. The HP ground flare is subject to the flare requirements contained in OAC rule 3745-21-09(DD)(10)(d). The flare requirements specified by this rule are equivalent to or less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

h. The permittee shall properly install, operate, and maintain a device to continuously monitor the flare pilot flame. The monitoring device and any recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.

c) Operational Restrictions

(1) The HP ground flare shall be designed and operated as follows:

a. The flare shall be designed for and operated with no visible emissions, as determined by Method 22 of Appendix A of 40 CFR Part 60, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

b. The flare shall be operated with a flame present at all times when gases are vented to it. The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame. The net heating value of the gas being combusted and the actual exit velocity shall be calculated as required in the Testing Section of this permit.

c. The net heating value (H_T) of the gas being combusted and actual exit velocity of the flare shall be calculated as required in the Testing Section of this permit.

(2) The HP ground flare shall be steam-assisted, air-assisted, or non-assisted, and shall comply with the following requirements for the heat content in paragraph "a" **and** the maximum tip velocity in paragraph "b", **or** shall comply with the alternative requirements in paragraph "c" for non-assisted flares:

a. Steam-assisted or air-assisted flares shall have a net heating value of 300 Btu/scf (11.2 MJ/scm) or greater, for the gas being combusted.

Non-assisted flares shall have a net heating value of 200 Btu/scf (7.45 MJ/scm) for the gas being combusted.

b. Steam-assisted and/or non-assisted flares shall be designed for and operated with an exit velocity of less than 18.3 m/sec (60 ft/sec), with the following exceptions:

i. steam-assisted and non-assisted flares, having a net heating value of 1,000 Btu/scf (37.3 MJ/scm) for the gas being combusted, can be designed for and operated with an exit velocity equal to or greater than 18.3 m/sec (60 ft/sec), but less than 122 m/sec (400 ft/sec); and

steam-assisted and non-assisted flares can be designed for and operated with an exit velocity of less than the velocity calculated below for V_{max}, and less than 122 m/sec (400 ft/sec):

$$\text{Log10}\ (V_{max}) = (H_T + 28.8)/31.7$$

where:

V_{max} = maximum permitted velocity, m/sec;

28.8 = constant;

31.7 = constant; and

H_T = the net heating value as determined in the Testing Section of this permit.

ii. Air-assisted flares shall be designed and operated with an exit velocity less than the velocity V_{max}, calculated as follows:

$V_{max} = 8.706 + 0.7084\ (H_T)$
where:

V_{max} = maximum permitted velocity, m/sec;
8.706 = constant;
0.7084 = constant; and
H_T = the net heating value as determined in the Testing Section of this permit.

OR

c. Non-assisted flares that have a diameter of 3 inches or greater and a hydrogen content of 8.0 percent (by volume), or greater, shall be designed for and operated with an exit velocity of less than 37.2 m/sec (122 ft/sec) and less than the velocity, V_{max}, as determined by the following equation:

$$V_{max} = (X_{H2} - K_1) K_2$$

where:

V_{max} = maximum permitted velocity, m/sec;

K_1 = constant, 6.0 volume-percent hydrogen;

K_2 = constant, 3.9 (m/sec)/volume-percent hydrogen; and

X_{H2} = the volume-percent of hydrogen, on a wet basis, as calculated by using the ASTM Method D1946-90.

(3) The permittee may request a determination of alternative means of emission limitation (AMEL) as outlined in the table below to the flare requirements of the following 40 CFR Part 60 and 63 Subparts:

40 CFR Part 60 and 63 Subparts	**Provisions for AMEL**
40 CFR Part 60 Subpart NNN	Clean Air Act section 111(h)(3)
40 CFR Part 60 Subpart RRR	Clean Air Act section 111(h)(3)
40 CFR Part 63 Subpart SS	Clean Air Act section 112(h)(3)
40 CFR Part 63 Subpart YY	40 CFR Part 63.1113

(4) A pilot flame shall be maintained at all times in the flare's pilot light burner. The presence of the pilot flame shall be monitored using a thermocouple or other equivalent device to detect the presence of a flame.

(5) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660-668).

(6) See 40 CFR Part 60, Subpart RRR (40 CFR Part 60.700 – 60.708)

(7) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(8) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall monitor the flare to ensure that it is operated and maintained in conformance with its design and the requirements contained in this permit. The net heating value of a gas, the actual exit velocity for the flare shall be determined as specified 40 CFR 60.18 and 40 CFR 63.11.

(2) The permittee shall record the following information each day for the flare and process operations:

a. The permittee shall record all periods of time during which there was no pilot flame or the flare was inoperable.

(3) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660-668).

(4) See 40 CFR Part 60, Subpart RRR (40 CFR Part 60.700 – 60.708)

(5) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(6) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation reports that identify all periods of time during which the pilot flame was not functioning properly, or the flare was not maintained as required in this permit. The reports shall include the date, time, and duration of each such period.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660-668).

(3) See 40 CFR Part 60, Subpart RRR (40 CFR Part 60.700 – 60.708)

(4) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(5) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emission Limitation:

There shall be no visible emissions from the flare, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

Applicable Compliance Method:

If required, compliance with the visible emissions limitation shall be determined in accordance with U.S. EPA Method 22 in Appendix A of 40 CFR Part 60.

b. Emission Limitations:

Annual emissions from normal operations of the HP ground flare shall not exceed:

CO – 2.917 tons per rolling 12-month period;

NO_x – 0.536 ton per rolling 12-month period;

$PM_{10}/PM_{2.5}$ - 0.059 ton per rolling 12-month period;

VOC – 4.494 tons per rolling 12-month period; and

CO_2e – 923 tons per rolling 12-month period.

Applicable Compliance Method:

Compliance with the annual emission limitations is demonstrated based upon the following calculation:

$$M_p = EF_p \left(\frac{1.8\ \text{MMBtu}}{\text{hr}}\right)\left(\frac{8760\ \text{hrs}}{12\ \text{months}}\right)\left(\frac{1\ \text{ton}}{2000\ \text{lbs}}\right)$$

Where:

Mp = maximum annual emissions of pollutant p in tons per rolling 12-month period;

EF_p= emission factor for the individual pollutant in lb/MMBtu:

NOx = 0.068 [emission factor from U.S. EPA AP-42, Chapter 13.5 (4/2015)];

CO = 0.37 [emission factor from U.S. EPA AP-42, Chapter 13.5 (4/2015)];

VOC = 0.57 [emission factor from U.S. EPA AP-42, Chapter 13.5 (4/2015)];

CO_2e = 116.89 [based on emissions of carbon dioxide (CO_2), methane (CH_4), and nitrogen dioxide (N_2O) adjusted for global warming potentials. CO2 and CH4 emissions based on factors from 40 CFR 98, Tables C-1 & C-2. N_20 emissions based on factors from 40 CFR 98, Table C-1 and AP-42, Chapter 13.5 (4/2015);

1.8 MMBtu/hr = maximum heat input for HP ground flare-based engineering calculations of natural gas usage for pilot flame and purge gas and maximum VOC flaring rate based on cold-startup as "worst-case" scenario; and

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period;

c. Emission Limitations:

Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)b.; and

Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Compliance shall be demonstrated by the requirements outlined in 40 CFR Part 60.18 Subpart A, 40 CFR Part 63.11, 40 CFR Part 63, Subpart YY, and 40 CFR Part 63, Subpart SS, as applicable.

g) Miscellaneous Requirements

(1) None.

10. P004, Low Pressure Ground Flare (B-5002)

Operations, Property and/or Equipment Description:

127 MMBtu/hr low-pressure, multi-point, staged ground flare

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)c., b)(2)e. and b)(2)f.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate matter 10 microns or less in size (PM_{10}), particulate matter 2.5 microns or less in size ($PM_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO_x) and carbon dioxide equivalents (CO_2e). See b)(2)b.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)c. and b)(2)d.
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)e. and b)(2)f.
d.	OAC rule 3745-21-09(DD)	See b)(2)g.
e.	40 CFR Part 60, Subpart NNN (40 CFR 60.660 – 60.668) [This emissions unit is used to meet the control requirements specified in this section]	Flare requirements, monitoring, reporting and testing [40 CFR 60.660 through 60.668] See c)(5), d)(3) and e)(3).
f.	40 CFR Part 60, Subpart RRR (40 CFR 60.700 – 60.708) [This emissions unit is used to meet the control requirements specified in this section]	Flare requirements, monitoring, testing, and reporting [40 CFR 60.700 through 60.708] See c)(6), d)(4) and e)(4).
g.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	All of the General Provisions of 40 CFR Part 60, Subpart A are applicable except

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		for the following: §60.7(c) does not apply to 40 CFR Subpart NNN [§60.665(k)]; and §60.7(c) does not apply to 40 CFR Subpart RRR [§60.705(k)]
h.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) This emissions unit is used to meet the control requirements specified in 40 CFR Part 63, Subpart YY and is referenced for use by the above subpart]	Closed vent system and flare requirements [40 CFR 63.980 – 63.999] See c)(7), d)(5) and e)(5).
i.	40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114) [This emissions unit is used to meet the control requirements specified in this section]	Flare requirements [40 CFR 63.1100 – 63.1114] See c)(8), d)(6) and e)(6).
j.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	General Provisions [§63.1 through §60.16]

(2) Additional Terms and Conditions

a. The low pressure (LP) ground flare is used to meet control requirements associated with BACT, New Source Performance Standards (NSPS), BAT, and Maximum Achievable Control Technology for affected facility operations and process vents. For efficient permitting structure, the ECU ground flare has been permitted as a separate and individual emissions unit to contain limitations, operational restrictions, monitoring, record keeping, reporting, and testing associated with control requirements.

b. BACT requirements for the LP ground flare have been determined to be the following:

i. designed and operated to meet a 98% destruction efficiency for VOC.

ii. no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

iii. flaring emissions (normal operations) shall not exceed the following:

(a) CO – 1.26 tons per rolling 12-month period;

(b) NO_x – 0.232 ton per rolling 12-month period;

(c) $PM_{10}/PM_{2.5}$* - 0.026 ton per rolling 12-month period;

(d) VOC – 1.97 tons per rolling 12-month period; and

(e) CO2e – 400 tons per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

c. BAT requirements under OAC rule 3745-31-05(A)(3) have been determined to be:

i. for NO_x, CO, VOC, and $PM_{10}/PM_{2.5}$ – compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

ii. emissions of sulfur dioxide are negligible and are not addressed by BAT requirements in this permit.

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of NO_x, CO, VOC, and $PM_{10}/PM_{2.5}$ from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable).

f. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

g. The LP ground flare is subject to the flare requirements contained in OAC rule 3745-21-09(DD)(10)(d). The flare requirements specified by this rule are equivalent to or less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

h. The permittee shall properly install, operate, and maintain a device to continuously monitor the flare pilot flame. The monitoring device and any recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.

c) Operational Restrictions

(1) The LP ground flare shall be designed and operated as follows:

a. The flare shall be designed for and operated with no visible emissions, as determined by Method 22 of Appendix A of 40 CFR Part 60, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

b. The flare shall be operated with a flame present at all times when gases are vented to it. The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame. The net heating value of the gas being combusted and the actual exit velocity shall be calculated as required in the Testing Section of this permit.

c. The net heating value (H_T) of the gas being combusted and actual exit velocity of the flare shall be calculated as required in the Testing Section of this permit.

(2) The ECU ground flare shall be steam-assisted, air-assisted, or non-assisted, and shall comply with the following requirements for the heat content in paragraph "a" **and** the maximum tip velocity in paragraph "b", **or** shall comply with the alternative requirements in paragraph "c" for non-assisted flares:

a. Steam-assisted or air-assisted flares shall have a net heating value of 300 Btu/scf (11.2 MJ/scm) or greater, for the gas being combusted.

Non-assisted flares shall have a net heating value of 200 Btu/scf (7.45 MJ/scm) for the gas being combusted.

b. Steam-assisted and/or non-assisted flares shall be designed for and operated with an exit velocity of less than 18.3 m/sec (60 ft/sec), with the following exceptions:

i. steam-assisted and non-assisted flares, having a net heating value of 1,000 Btu/scf (37.3 MJ/scm) for the gas being combusted, can be designed for and operated with an exit velocity equal to or greater than 18.3 m/sec (60 ft/sec), but less than 122 m/sec (400 ft/sec); and

steam-assisted and non-assisted flares can be designed for and operated with an exit velocity of less than the velocity calculated below for V_{max}, and less than 122 m/sec (400 ft/sec):

$$\text{Log10}\ (V_{max}) = (H_T + 28.8)/31.7$$

where:

V_{max} = maximum permitted velocity, m/sec;

28.8 = constant;

31.7 = constant; and

H_T = the net heating value as determined in the Testing Section of this permit.

ii. Air-assisted flares shall be designed and operated with an exit velocity less than the velocity V_{max}, calculated as follows:

$V_{max} = 8.706 + 0.7084\ (H_T)$
where:

V_{max} = maximum permitted velocity, m/sec;
8.706 = constant;
0.7084 = constant; and
H_T = the net heating value as determined in the Testing Section of this permit.

OR

c. Non-assisted flares that have a diameter of 3 inches or greater and a hydrogen content of 8.0 percent (by volume), or greater, shall be designed for and operated with an exit velocity of less than 37.2 m/sec (122 ft/sec) and less than the velocity, V_{max}, as determined by the following equation:

$$V_{max} = (X_{H2} - K_1) K_2$$

where:

V_{max} = maximum permitted velocity, m/sec;

K_1 = constant, 6.0 volume-percent hydrogen;

K_2 = constant, 3.9 (m/sec)/volume-percent hydrogen; and

X_{H2} = the volume-percent of hydrogen, on a wet basis, as calculated by using the ASTM Method D1946-90.

(3) The permittee may request a determination of alternative means of emission limitation (AMEL) as outlined in the table below to the flare requirements of the following 40 CFR Part 60 and 63 Subparts:

40 CFR Part 60 and 63 Subparts	**Provisions for AMEL**
40 CFR Part 60 Subpart NNN	Clean Air Act section 111(h)(3)
40 CFR Part 60 Subpart RRR	Clean Air Act section 111(h)(3)
40 CFR Part 63 Subpart SS	Clean Air Act section 112(h)(3)
40 CFR Part 63 Subpart YY	40 CFR Part 63.1113

(4) A pilot flame shall be maintained at all times in the flare's pilot light burner. The presence of the pilot flame shall be monitored using a thermocouple or other equivalent device to detect the presence of a flame.

(5) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660-668).

(6) See 40 CFR Part 60, Subpart RRR (40 CFR Part 60.700 – 60.708)

(7) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(8) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall monitor the flare to ensure that it is operated and maintained in conformance with its design and the requirements contained in this permit. The net heating value of a gas, the actual exit velocity for the flare shall be determined as specified 40 CFR 60.18 and 40 CFR 63.11.

(2) The permittee shall record the following information each day for the flare and process operations:

a. The permittee shall record all periods of time during which there was no pilot flame or the flare was inoperable.

(3) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660-668).

(4) See 40 CFR Part 60, Subpart RRR (40 CFR Part 60.700 – 60.708)

(5) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(6) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation reports that identify all periods of time during which the pilot flame was not functioning properly or the flare was not maintained as required in this permit. The reports shall include the date, time, and duration of each such period.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) See 40 CFR Part 60, Subpart NNN (40 CFR 60.660-668).

(3) See 40 CFR Part 60, Subpart RRR (40 CFR Part 60.700 – 60.708)

(4) See 40 CFR Part 63, Subpart SS (40 CFR 63.980-999).

(5) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100-1114).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emission Limitation:

There shall be no visible emissions from the flare, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

Applicable Compliance Method:

If required, compliance with the visible emissions limitation shall be determined in accordance with U.S. EPA Method 22 in Appendix A of 40 CFR Part 60.

b. Emission Limitations:

Annual emissions from the ECU Ground Flare shall not exceed:

CO – 1.26 tons per rolling 12-month period;

NO_x – 0.232 tons per rolling 12-month period;

$PM_{10}/PM_{2.5}$ - 0.026 ton per rolling 12-month period;

VOC – 1.97 tons per rolling 12-month period; and

CO_2e – 400 tons per rolling 12-month period.

Applicable Compliance Method:

Compliance with the annual emission limitations is demonstrated based upon the following calculation:

$$M_p = EF_p \left(\frac{0.78\ \text{MMBtu}}{\text{hr}}\right)\left(\frac{8760\ \text{hrs}}{12\ \text{months}}\right)\left(\frac{1\ \text{ton}}{2000\ \text{lbs}}\right)$$

Where:

Mp = maximum annual emissions of pollutant p in tons per rolling 12-month period;

EF_p= emission factor for the individual pollutant in lb/MMBtu:

NOx = 0.068 [emission factor from U.S. EPA AP-42, Chapter 13.5 (4/2015)];

CO = 0.37 [emission factor from U.S. EPA AP-42, Chapter 13.5 (4/2015)];

VOC = 0.57 [emission factor from U.S. EPA AP-42, Chapter 13.5 (4/2015)];

CO_2e = 116.89 [based on emissions of carbon dioxide (CO_2), methane (CH_4), and nitrogen dioxide (N_2O) adjusted for global warming potentials. CO2 and CH4

emissions based on factors from 40 CFR 98, Tables C-1 & C-2. N_20 emissions based on factors from 40 CFR 98, Table C-1 and AP-42, Chapter 13.5 (4/2015);

0.78 MMBtu/hr = maximum heat input for ECU Ground Flare based engineering calculations of natural gas usage for pilot flame and purge gas and maximum VOC flaring rate based on cold-startup as "worst-case" scenario; and

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period;

c. Emission Limitations:

Combust the emissions in a flare that meets the requirements of §60.18. The flare requirements of §60.18 are consistent with a destruction efficiency of 98% for VOC emissions required in b)(2)b.; and

Reduce emissions of organic HAP by 98 weight-percent; or reduce organic HAP or TOC to a concentration of 20 parts per million by volume; whichever is less stringent.

Applicable Compliance Method:

Compliance shall be demonstrated by the requirements outlined in 40 CFR Part 60.18 Subpart A, 40 CFR Part 63.11, 40 CFR Part 63, Subpart YY, and 40 CFR Part 63, Subpart SS, as applicable.

g) Miscellaneous Requirements

(1) None.

11. P806, Wastewater Collection and Treatment

Operations, Property and/or Equipment Description:

Wastewater treatment plant and associated collection and treatment systems for treatment of wastewater generated in the ethylene manufacturing process, the high-density polyethylene units, the linear low-density polyethylene units, the air separation unit, and all sanitary wastewater; includes an oily water treatment plant, a process biological treatment plant and a sanitary treatment plant; emissions sources include: a 12% $NaClO_2$ storage tank (T-5205) and a 98% sulfuric acid storage tank (T-3502) vented to atmosphere, a wet air oxidation unit, an equalization tank (T-6503), an oily wastewater storage tank (T-6501), a corrugated plate interceptor (CPI) package, a waste oil tank (T-6502), a dissolved gas floatation (DGF) unit and GCF/CPI sump covered and vented to one primary and one backup 1.0 MMBtu/hr thermal oxidizers

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)d. and b)(2)d.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Volatile organic compound (VOC) emissions from the thermal oxidizer stack shall not exceed 0.01 pound per hour and 0.02 ton per rolling, 12-month period. Nitrogen oxides (NO_x) emissions shall not exceed 0.098 pound per hour and 0.43 ton per rolling, 12-month period. Carbon monoxide (CO) emissions shall not exceed 0.082 pound per hour and 0.36 ton per rolling, 12-month period. Particulate emissions (PE) and emissions of particulate matter less than 10 microns (PM10) and particulate matter less than 2.5 microns (PM2.5) shall not exceed 0.008 pound per hour and 0.030 ton per rolling, 12-month period.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		Visible PE from the thermal oxidizer stack shall not exceed five percent opacity, as a six-minute average. Carbon dioxide equivalents (CO_2e) emissions shall not exceed 513 tons per rolling, 12-month period. See b)(2)a. and b. below.
b.	ORC 3704.03(T) and OAC rule 3745-31-05(A)(3)	The requirements of this rule are equivalent to the requirements of OAC rules 3745-31-10 through 3745-31-20 for volatile organic compound (VOC) emissions. Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the CO_2e emissions from this air contaminant source pursuant to OAC rule 3745-31-34(E)(8).
c.	OAC rule 3745-31-05(A)(3), as effective June 30, 2008	The requirements of this rule are equivalent to the requirements of OAC rules 3745-31-10 through 3745-31-20 for NO_x, CO, and $PE/PM_{10}/PM_{2.5}$. See b)(2)c. and c)(1) below.
d.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective June 30, 2008	The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of NO_x, CO, SO_2 and $PE/PM_{10}/PM_{2.5}$ from this air contaminant source since the potential to emit is less than 10 tons/year. See b)(2)d. below.
e.	OAC rule 3745-17-11(B)	See b)(2)e. below.
f.	OAC rule 3745-17-07(A)	See b)(2)f. below.
g.	40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114) [In accordance with 40 CFR 63.1100, Table 1 of 40 CFR 63.1100, and 63.1103(e)(1)(E), this emissions unit manages waste streams from a new ethylene production unit that contain 1,3 butadiene or benzene and are	*Requirements for ethylene production unit:* Meet the requirements in Table 7(g) of 40 CFR 63.1103(e) to control organic HAP emissions from ethylene production processes by complying with the waste requirements of 40 CFR Part 63, Subpart XX. [40 CFR 63.1103(e)(3) and Table 7(g)]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	subject to the emissions limitations/control measures specified in this section.]	The oily waste water storage tank (5T-6501) and the waste oil tank (5T-6502) are exempt from the requirements of 40 CFR 63.1103(e)(3) because they store organic liquids that contain organic HAP as impurities. [40 CFR 63.1103(e)(1)(ii)(G)]
h.	40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1097) [In accordance with 40 CFR 63.1080, 63.1092(a) and 63.1093, this emissions unit manages waste streams from a new ethylene production unit that is a major source of hazardous air pollutants (HAPs) referenced to 40 CFR Part 63, Subpart XX from 40 CFR Part 63, Subpart YY, and are subject to the emissions limitations/control measures specified in this section.]	*Continuous butadiene waste streams from ethylene production unit:* Manage and treat continuous butadiene waste streams from ethylene production units that contain greater than or equal to 10 ppmw 1,3-butadiene and have a flow rate greater than or equal to 0.02 liters per minute, according to either paragraph (a)(1) or (2) of 40 CFR 63.1095, except during periods of startup, shutdown and malfunction, if the startup, shutdown or malfunction precludes the ability to comply with the requirements of 40 CFR 63.1095(a) and the provisions specified in 40 CFR 63.1111 are met. [40 CFR 63.1095(a)] *Waste streams that contain benzene from ethylene production unit:* Comply with requirements of 40 CFR Part 61, Subpart FF for waste streams from ethylene production units that contain benzene, except as specified in Table 2 of 40 CFR Part 63, Subpart XX. See b)(1)e. below. [40 CFR 63.1095(b) and Table 2 of 40 CFR Part 63, Subpart XX] Manage and treat spent caustic waste streams and dilution steam blowdown waste streams from ethylene production units according to 40 CFR 61.342(c)(1)-(3)(i), except during periods of startup, shutdown and malfunction, if the startup, shutdown or malfunction precludes the ability to comply with the requirements of

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		40 CFR 63.1095(b)(1) and the provisions specified in 40 CFR 63.1111 are met. [40 CFR 63.1095(b)(1)]
i.	40 CFR Part 61, Subparts A and FF (40 CFR 61.01 – 61.19 and 40 CFR 61.340 – 61.359) [In accordance with 40 CFR 61.340, this emissions unit manages benzene-containing hazardous waste from a chemical manufacturing plant that is a hazardous waste treatment, storage, and disposal facility subject to the emissions limitations/control measures specified in these sections.]	*Source-wide requirements:* This facility is exempt from the requirements of 40 CFR 61.342(b) and (c) because the total annual benzene quantity from facility waste is less than 10 megagrams (MG)(11 tons) calculated according to 40 CFR 61.342(a). See b)(2)a.i. below. [40 CFR 61.342(a)] *Requirements for spent caustic waste streams and dilution steam blowdown waste streams containing benzene from the ethylene production unit:* Pursuant to 40 CFR 63.1095(b)(1) and 61.342(c), for each spent caustic waste stream and each dilution steam blowdown waste stream from ethylene production units that contains benzene, including (but not limited to) organic waste streams that contain less than 10 percent water and aqueous waste streams, even if the wastes are not discharged to an individual drain system, the permittee shall: Remove or destroy the benzene contained in the waste using a treatment process or wastewater treatment system that complies with the standards specified in 40 CFR 61.348. [40 CFR 61.342(c)(1)(i)] Comply with the standards specified in 40 CFR 61.343 through 61.347 for each waste management unit that receives or manages the waste stream prior to and during treatment of the waste stream in accordance with paragraph (c)(1)(i). See b)(2)a.i. and b)(2)a.ii. below. [40 CFR 61.342(c)(1)(ii)]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		Each waste management unit used to manage or treat waste streams that will be recycled to a process shall comply with the standards specified in 40 CFR 61.343 through 61.347. Once the waste stream is recycled to a process, including to a tank used for the storage of production process feed, product, or product intermediates, unless this tank is used primarily for the storage of wastes, the material is no longer subject to 40 CFR 61.342(c). [40 CFR 61.342(c)(1)(iii)] Spent caustic waste streams and dilution steam blowdown waste streams from ethylene production units are exempt from 40 CFR 61.342(c)(1) if the permittee demonstrates initially and, thereafter, at least once per year, that the flow-weighted annual average benzene concentration for the waste stream is less than 10 ppmw as determined by the procedures specified in 40 CFR 61.355(c)(2) or 61.355(c)(3). [40 CFR 61.342(c)(2)] Spent caustic waste streams and dilution steam blowdown waste streams from ethylene production units are exempt from 40 CFR 61.342(c)(1) provided that the permittee demonstrates initially and, thereafter, at least once per year that the waste stream is process wastewater that has a flow rate less than 0.02 liters per minute (0.005 gallons per minute) or an annual wastewater quantity of less than 10 Mg/yr (11 ton/yr). [40 CFR 61.342(c)(3)] See b)(2)a.iii. below.
k.	40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550) [In accordance with 40 CFR 63.2430, 63.2435 and 63.2440, this	*Requirements for polyethylene manufacturing units:* Comply with the emission limits and work practice standards in Tables 1 through 7

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	emissions unit includes wastewater and waste management units associated with new polyethylene manufacturing units subject to the emissions limitations/control measures specified in this section.]	of 40 CFR Part 63, Subpart FFFF at all times, except during periods of startup, shutdown, and malfunction (SSM). [40 CFR 63.2450(a)] Pursuant to 40 CFR 63.2485(a), meet each requirement in Table 7 of 40 CFR Part 63, Subpart FFFF applicable to wastewater streams and liquid streams in open systems generated in the polyethylene manufacturing units: For each process wastewater stream, comply with the requirements in 40 CFR 63.132 through 63.148, except as specified in 40 CFR 63.2485. [Table 7(1.) of 40 CFR Part 63, Subpart FFFF] For each maintenance wastewater stream, comply with the requirements in 40 CFR 63.105, except as specified in 40 CFR 63.2485. [Table 7(2.) of 40 CFR Part 63, Subpart FFFF] For liquid streams in an open system within the polyethylene manufacturing units, comply with the requirements in 40 CFR 63.149, except as specified in 40 CFR 63.2485. [Table 7(3.) of 40 CFR Part 63, Subpart FFFF] See b)(2)a.iv. below.
l.	40 CFR Part 63, Subpart A (40 CFR 63.1 - 63.16)	General Provisions

(2) Additional Terms and Conditions

a. As part of the BACT determination for fugitive VOC emissions, the permittee shall:

i. Use an enhanced biodegradation unit to maintain the annual benzene quantity from facility waste at less than 10 megagrams (MG; 11 tons) by combining waste streams with greater than 10 ppmw benzene with waste

streams with less than 10 ppmw benzene to form a combined waste stream with a benzene concentration less than 10 ppmw;

ii. Route emissions from wastewater generated in the ethylene manufacturing process to a thermal oxidizer designed to achieve ≥99.5% destruction efficiency for volatile organic compounds (VOC);

iii. Cover and route emissions from the process wastewater equalization tank (T-6503), the waste oil drum (T-6502), the oily wastewater storage tank (T-6501) and the wet air oxidation unit to a thermal oxidizer designed to achieve ≥99.5% destruction efficiency for VOC;

iv. Emissions from wastewater generated in the high-density polyethylene units must comply with the applicable requirements of 40 CFR Part 63, Subpart FFFF;

v. Emissions from the 98% sulfuric acid storage tank (T-3502) and the 12% $NaClO_2$ storage tank (T-5205) shall be vented directly to the atmosphere at a safe location.

Compliance with these requirements shall be demonstrated by compliance with the emissions limitations in b)(1)a. and the monitoring and recordkeeping required in d).

b. As part of the BACT determination for NO_x, CO, SO_2 and $PE/PM_{10}/PM_{2.5}$ emissions, compliance with the BACT requirements shall be demonstrated by compliance with the emissions limitations in b)(1)a.

c. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

d. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

e. The uncontrolled mass rate of particulate emissions from the thermal oxidizer is less than 10 pounds per hour. Therefore, pursuant to OAC rule 3745-17-11(A)(2)(a)(ii), Figure II of OAC rule 3745-17-11 does not apply. In addition, Table I of OAC rule 3745-17-11 does not apply because of the location in Belmont County.

f. The emissions from the thermal oxidizer are exempt from the visible particulate emission limitations specified in OAC rule 3745-17-07(A), pursuant to OAC rule 3745-17-07(A)(3)(h), because the emissions unit is not subject to the requirements of OAC rule 3745-17-11.

g. The permittee shall comply with 40 CFR Part 61, Subpart FF and 40 CFR Part 63, Subparts F, G, XX, YY and FFFF upon startup.

c) Operational Restrictions

(1) The permittee shall burn only gaseous fuels (i.e., natural gas and waste gas) in this emissions unit. The sulfur content of gaseous fuels combusted shall not exceed 0.005 gr/dscf.

(2) See 40 CFR Part 61, Subpart FF (40 CFR 61.340 – 61.359).

(3) See 40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1097).

(4) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114).

(5) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

d) Monitoring and/or Recordkeeping Requirements

(1) In order to maintain compliance with the applicable emission limitation(s) contained in this permit, the acceptable average combustion temperature within the thermal oxidizer, for any 3-hour block of time when process and/or storage tank emissions are vented to the thermal oxidizer, shall not be below the average temperature measured during the most recent performance test that demonstrated compliance. Until compliance testing has been conducted, the thermal oxidizer shall be operated and maintained in accordance with the manufacturer's recommendations, instructions, and the operating manual.

(2) The permittee shall properly install, operate, and maintain a continuous temperature monitor and recorder that measures and records the combustion temperature within the thermal oxidizer when process and/or storage tank emissions are vented to the thermal oxidizer, including periods of startup and shutdown. Units shall be in degrees Fahrenheit. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within $\pm$ 1 percent of the temperature being measured or $\pm$ 5 degrees Fahrenheit, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer’s recommendations, instructions, and the operating manuals, with any modifications deemed necessary by the permittee. The acceptable temperature setting shall be based upon the manufacturer’s specifications until such time as any required performance testing is conducted and the appropriate temperature range is established to demonstrate compliance. Following compliance testing, the permittee shall collect and record the following information each day the thermal oxidizer is utilized for control:

a. all 3-hour blocks of time, when process and/or storage tank emissions are vented to the thermal oxidizer, during which the average combustion temperature within the thermal oxidizer was below the average temperature measured during the most recent performance test that demonstrated compliance; and

b. a log or record of the operating time for the capture (collection) system, thermal oxidizer, monitoring equipment, and associated emissions unit(s).

These records shall be maintained at the facility for a period of five years.

(3) Whenever the monitored average combustion temperature within the thermal oxidizer deviates from the range or limit established in accordance with this permit, the permittee shall promptly investigate the cause of the deviation. The permittee shall maintain records of the following information for each investigation:

a. the date and time the deviation began;

b. the magnitude of the deviation at that time;

c. the date the investigation was conducted;

d. the name(s) of the personnel who conducted the investigation; and

e. the findings and recommendations.

In response to each required investigation to determine the cause of a deviation, the permittee shall take prompt corrective action to bring the operation of the control equipment within the acceptable range/limit specified in this permit, unless the permittee determines that corrective action is not necessary and documents the reasons for that determination and the date and time the deviation ended. The permittee shall maintain records of the following information for each corrective action taken:

f. a description of the corrective action;

g. the date corrective action was completed;

h. the date and time the deviation ended;

i. the total period of time (in minutes) during which there was a deviation;

j. the temperature readings immediately after the corrective action was implemented; and

k. the name(s) of the personnel who performed the work.

Investigation and records required by this paragraph do not eliminate the need to comply with the requirements of OAC rule 3745-15-06 if it is determined that a malfunction has occurred.

(4) The permittee shall maintain monthly records of the following information:

a. the hours this emissions unit operated, in hours per month;

b. the amount of gaseous fuels consumed in this emissions unit, in MMscf;

c. the heat content of the gaseous fuels combusted in this emissions unit, in MMBtu/MMscf;

d. the sulfur content of the gaseous fuels combusted in this emissions unit, in gr/dscf;

e. the total VOC emissions, in pounds, calculated by multiplying the VOC emission factor of 0.0054 lb/MMBtu, or the results of the most recent stack test, by the amount of gaseous fuel consumed, as recorded in d)(4)b. and the heat content of the gaseous fuel consumed, as recorded in d)(4)c.;

f. the total NO_x emissions, in pounds, calculated by multiplying the NO_x emissions factor of 0.098 lb/MMBtu, or the results of the most recent stack test, by the amount of gaseous fuel consumed, as recorded in d)(4)b. and the heat content of the gaseous fuel consumed, as recorded in d)(4)c.;

g. the total CO emissions, in pounds, calculated by multiplying the CO emissions factor of 0.082 lb/MMBtu, or the results of the most recent stack test, by the amount of gaseous fuel consumed, as recorded in d)(4)b. and the heat content of the gaseous fuel consumed, as recorded in d)(4)c.;

h. the total $PE/PM_{10}/PM_{2.5}$ emissions, in pounds, calculated by multiplying the $PE/PM_{10}/PM_{2.5}$ emissions factor of 0.0075 lb/MMBtu, or the results of the most recent stack test, by the amount of gaseous fuel consumed, as recorded in d)(4)b. and the heat content of the gaseous fuel consumed, as recorded in d)(4)c.;

i. the total CO_2e emissions, in pounds, calculated by multiplying the CO_2e emissions factor of 117.00 lbs/MMBtu, by the amount of gaseous fuel consumed, as recorded in d)(4)b. and the heat content of the gaseous fuel consumed, as recorded in d)(4)c.;

j. The rolling, 12-month summation of the VOC emissions, in tons, calculated by adding the total VOC emissions for the present month as recorded in d)(4)e., plus the total VOC emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

k. the rolling, 12-month summation of the NO_x emissions, in tons, calculated by adding the total NO_x emissions for the present month as recorded in d)(7)f., plus the total NO_x emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

l. The rolling, 12-month summation of the CO emissions, in tons, calculated by adding the total CO emissions for the present month as recorded in d)(4)g., plus the total CO emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds;

m. The rolling, 12-month summation of the $PE/PM_{10}/PM_{2.5}$, in tons, calculated by adding the total $PE/PM_{10}/PM_{2.5}$ emissions for the present month as recorded in d)(4)h., plus the total $PE/PM_{10}/PM_{2.5}$ emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds; and

n. The rolling, 12-month summation of the CO_2e emissions, in tons, calculated by adding the total CO_2e emissions for the present month as recorded in d)(4)i., plus the total CO_2e emissions for the previous 11 months, and dividing by 1 ton/2,000 pounds.

(5) See 40 CFR Part 61, Subpart FF (40 CFR 61.340 – 61.359).

(6) See 40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1097).

(7) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114).

(8) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

e) Reporting Requirements

(1) The permittee shall submit quarterly summaries of the following records:

a. all 3-hour blocks of time (when process and/or storage tank emissions are vented to the thermal oxidizer) during which the average combustion temperature within the thermal oxidizer was below the average temperature maintained during the most recent performance test that demonstrated compliance;

b. any records of downtime (date and length of time) for the capture (collection) system, the thermal oxidizer, and/or the monitoring equipment when process and/or storage tank emissions are vented to the thermal oxidizer; and

c. a log of the operating time for the capture system, thermal oxidizer, monitoring equipment, and when process and/or storage tank emissions are vented to the thermal oxidizer.

These quarterly reports shall be submitted by April 30, July 31, October 31, and January 31, and shall cover the records for the previous calendar quarters.

(2) The permittee shall submit quarterly deviation (excursion) reports that identify the following:

a. Any record which shows the sulfur content of the natural gas exceeded exceed 0.005 gr/dscf; and

b. All exceedances of the rolling, 12-month VOC, NO_x, CO, PE/PM_{10}/$PM_{2.5}$ and CO_2e emissions limitations.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(3) See 40 CFR Part 61, Subpart FF (40 CFR 61.340 – 61.359).

(4) See 40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1097).

(5) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114).

(6) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

VOC emissions from the thermal oxidizer stack shall not exceed 0.01 pounds per hour and 0.02 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitation shall be demonstrated by the testing required in f)(2).

Compliance with the rolling, 12-month emissions limitations shall be demonstrated by the recordkeeping in d)(4).

b. Emissions Limitations:

NO_x emissions shall not exceed 0.098 pound per hour and 0.43 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitation shall be demonstrated by the testing required in f)(2).

Compliance with the rolling, 12-month emissions limitations shall be demonstrated by the recordkeeping in d)(4).

c. Emissions Limitations:

CO emissions shall not exceed 0.082 pound per hour and 0.36 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitation shall be demonstrated by the testing required in f)(2).

Compliance with the rolling, 12-month emissions limitations shall be demonstrated by the recordkeeping in d)(4).

d. Emissions Limitations:

PE and emissions of PM_{10} and $PM_{2.5}$ shall not exceed 0.008 pound per hour and 0.030 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitation shall be demonstrated by the testing required in f)(2).

Compliance with the rolling, 12-month emissions limitations shall be demonstrated by the recordkeeping in d)(4).

e. Emissions Limitation:

Visible PE from the thermal oxidizer stack shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

Compliance with this emissions limitation shall be demonstrated by the testing required in f)(2).

f. Emissions Limitation:

CO_2e emissions shall not exceed 513 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the rolling, 12-month emissions limitation shall be demonstrated by the recordkeeping in d)(4).

(2) The permittee shall conduct, or have conducted, emission testing for this emissions unit in accordance with the following requirements:

a. Emissions testing involving VOC shall be performed within 60 days of achieving the maximum production rate for this emissions unit, but not later than 180 days after initial startup. All other emission testing shall be conducted within 180 days after initial startup of the emissions unit.

b. The emission testing shall be conducted to demonstrate compliance with the destruction efficiency for VOC, the pounds per hour emissions limitations for VOC, NO_x, CO, PE/PM_{10}/$PM_{2.5}$, the VE limit and the reduction requirement for total organic HAPs.

c. The following test methods shall be employed to demonstrate compliance with the allowable emission limitations:

i. for NO_x – Methods 1 - 4 and 7 of 40 CFR Part 60, Appendix A;

ii. for CO – Methods 1 - 4 and 10 of 40 CFR Part 60, Appendix A;

iii. for VOC – Methods 1 - 4 and 18 and 25, as applicable, of 40 CFR Part 60 Appendix A;

iv. for PE – Methods 1 – 5 of 40 CFR Part 60 Appendix A;

v. for $PM_{10}/PM_{2.5}$ – Methods 1-4 of 40 CFR Part 60, Appendix A, and Methods 201, 201A, and 202 of 40 CFR Part 51, Appendix M;

vi. for opacity – Method 9 of 40 CFR, Part 60, Appendix A. Opacity readings shall be taken during the sampling runs for testing of the allowable emission limitations in f)(1);

vii. the destruction efficiency (i.e. the percent reduction in mass emissions between the inlet and outlet of the control system) shall be determined in accordance with the test methods and procedures specified in 3745-21-10(C)(3), or an alternative test protocol approved by the Ohio EPA. The test methods and procedures selected shall be based on a consideration of the diversity of the organic species present and their total concentration, and on a consideration of the potential presence of interfering gases; and

viii. the reduction of total organic HAPs shall be determined in accordance with the test methods and procedures specified in 40 CFR 63.116(c), 40 CFR 63.997, 40 CFR 61.355, 40 CFR Part 63, Subpart FFFF, and 40 CFR Part 63, Subpart YY* or an alternative test protocol approved by the Ohio EPA or U.S. EPA.

*Overlap provisions with other regulations within in the subpart may be applied.

Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA. Alternatives of test methods and procedures may involve approval from U.S. EPA based on the delegation of authority outlined within specific regulations.

d. During the emissions testing, the emissions unit shall be operated under operational conditions approved in advance by the appropriate Ohio EPA District Office or local air agency. Operational conditions that may need to be approved include, but are not limited to, the production rate, the type of material processed, material make-up (solvent content, etc.), or control equipment operational limitations (burner temperature, precipitator voltage, etc.). In general, testing shall be done under “worst case” conditions expected during the life of the permit. As part of the information provided in the “Intent to Test” notification form described below, the permittee shall provide a description of the emissions unit operational conditions they will meet during the emissions testing and describe why they believe “worst case” operating conditions will be met. Prior to conducting the test(s), the permittee shall confirm with the appropriate Ohio EPA District Office or local air agency that the proposed operating conditions constitute “worst case”. Failure to test under the approved conditions may result in Ohio EPA not accepting the test results as a demonstration of compliance.

e. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the appropriate Ohio EPA District Office or local air agency. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating

parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA District Office's or local air agency's refusal to accept the results of the emission test(s).

f. Personnel from the appropriate Ohio EPA District Office or local air agency shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

g. A comprehensive written report on the results of the emissions test(s) shall be signed by the person or persons responsible for the tests and submitted to the appropriate Ohio EPA District Office or local air agency within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the appropriate Ohio EPA District Office or local air agency.

(3) See 40 CFR Part 61, Subpart FF (40 CFR 61.340 – 61.359).

(4) See 40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1097).

(5) See 40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114).

(6) See 40 CFR Part 63, Subpart FFFF (40 CFR 63.2430 – 63.2550).

g) Miscellaneous Requirements

(1) None.

12. P807, Fugitive Emissions

Operations, Property and/or Equipment Description:

Facility-wide fugitive emissions from equipment and process unit leaks

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) None.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Best Available Control Technology (BACT) for volatile organic compounds (VOC) – see b)(2)b., b)(2)c. and b)(2)d. BACT for greenhouse gases (GHGs) - see b)(2)e.
b.	ORC 3704.03(T)	Best Available Technology (BAT) for VOC See b)(2)f.
c.	OAC rule 3745-21-09(DD)	Leak detection and repair program for equipment in a process unit that as an intermediate or final product one or more of the organic chemicals identified in Appendix A of OAC rule 3745-21-09. See c)(3), d)(4), e)(3) and f)(2)
d.	40 CFR Part 60, Subpart VVa (40 CFR Part 60.480a – 60.489a) [In accordance with 40 CFR 60.480a, this emissions unit involves equipment in synthetic organic chemicals manufacturing subject to the requirements specified in this section.]	Leak detection and repair for equipment within a process unit that produces chemicals listed in §60.489a [40 CFR 60.482-1a through 60.482-11a] See b)(2)a.
e.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	All of the General Provisions of 40 CFR Part 60, Subpart A are applicable except for the following:

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		§60.8(d) does not apply to 40 CFR Subpart VVa [§60.487a(e)];
f.	40 CFR Part 61, Subpart J (40 CFR 61.110 – 61.112) [In accordance with 40 CFR 61.110, this emissions unit involves fugitive leaks from sources in benzene service]	Equipment leak standards for equipment in benzene service [40 CFR 61.110 through 61.112] See b)(2)a.
h.	40 CFR Part 61, Subpart V (40 CFR 61.240 - 61.247) [In accordance with 40 CFR 61.240, this emissions unit involves fugitive leaks from sources in VHAP service]	Equipment leak standards and repair for volatile hazardous air pollutants (VHAP/Benzene) [§61.242-1 through §61.242-10] Closed vent system(s) and control device requirements [§61.242-11] See b)(2)a.
i.	40 CFR Part 61, Subpart A (40 CFR 61.01 – 61.19)	General Provisions [§61.01 through §61.19]
j.	40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999) Subpart SS provisions are referenced for use by other 40 CFR Part 63 Subparts for air emission control requirements including equipment leak requirements]	Equipment leak requirements and repair for closed vent systems and control devices [40 CFR 63.980 through 63.999] See b)(2)a.
k.	40 CFR Part 63, Subpart UU (40 CFR 63.1019 – 63.1039) [In accordance with 40 CFR 63.1019, this emissions unit involves closed vent systems, control devices and routing of air emissions to a fuel gas system for air emission control subject (by reference of other Part 63 Subparts) to the requirements specified in this section]	Equipment leak standards and repair [40 CFR 63.1021 through 63.1037] See b)(2)a.
l.	40 CFR Part 63, Subpart F (40CFR 63.100 – 63.107) [In accordance with 40 CFR 63.100(b) this emissions unit is a chemical manufacturing process unit manufacturing as a primary product one of the chemicals listed in “Table	This subpart provides applicability provisions, definitions, and other general provisions that are applicable to 40 CFR Part 63, Subparts G and H [40 CFR 63.100]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	1 to Subpart F]	
m.	40 CFR Part 63, Subpart H (40 CFR 63.160 – 63.183) [In accordance with 40 CFR 63.160, this emissions unit involves affected equipment that operate in organic hazardous air pollutant service]	Leak detection and repair for affected equipment in organic hazardous air pollutant service [40 CFR 63.160] See b)(2)a.
n.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	All of the General Provisions of 40 CFR Part 63, Subpart A apply except as indicated: The provisions of §63.1 to §63.16 do not apply to 40 CFR Part 63, Subpart SS and Subpart UU except as noted in referencing subparts [§63.980 and §63.1019]; and Table 4 to Subpart H of 40 CFR Part 63 – Applicable 40 CFR Part 63 General Provisions show which parts of the Provisions in 40 CFR Part 63.1 – 63.16 apply.

(2) Additional Terms and Conditions

a. The PTTGCA petrochemical complex involves equipment and process units subject to regulations involving fugitive leaks of VOC, HAPs, VHAP/Benzene, and GHGs. The permittee shall develop and implement a program addressing leak standards, leak control, and leak detection and repair in accordance with the requirements specified by the following:

i. for VOC:

(a) OAC rule 3745-31-10 through 20;

(b) ORC 3704.03(T);

(c) OAC rule 3745-21-09(DD);

(d) 40 CFR Part 60, Subpart VVa*;

ii. for HAP:

(a) 40 CFR Part 63, Subpart H*;

(b) 40 CFR Part 63, Subpart SS*; and

(c) 40 CFR Part 63, Subpart UU*.

iii. for VHAP/Benzene:

(a) 40 CFR Part 61, Subpart J*; and

(b) 40 CFR Part 61, Subpart V*.

iv. for GHGs:

(a) OAC rule 3745-31-10 through 20.

*The requirements of these applicable regulations have been included by using Incorporation by Reference (IBR), see c)(3), d)(3), and e)(2).

b. The permittee shall employ BACT for fugitive leaks of VOC. BACT has been determined to be the application of enhanced connector monitoring requirements to the most stringent leak detection and repair (LDAR) regulation applicable to affected equipment/process units. The following identifies LDAR requirements for affected equipment/process units which have been determined to representative of BACT:

i. 40 CFR Part 63 Subpart UU as applicable to the ethylene manufacturing process with enhanced connector monitoring;

ii. 40 CFR Part 60 Subpart VVa as applicable to the polyethylene manufacturing process with enhanced connector monitoring; an

c. The LDAR programs indicated above which are representative of BACT shall implement the following enhanced connector monitoring requirements:

i. connector monitoring subsequent to the initial monitoring required shall be performed on a quarterly basis;

ii. if following the initial four (4) consecutive quarters, the percent leaking connectors in a process unit is less than 0.5 percent during the most recent quarterly monitoring event, then the frequency of connector monitoring can be reduced to semi-annual;

iii. if following two (2) consecutive semi-annual periods, the percent leaking connectors in a process unit is less than 0.5 percent during the most recent semi-annual monitoring event, then the frequency of connector monitoring can be reduced to annual.

iv. If more than or equal to 0.5 percent of the connectors in a process unit are determined to be leaking during any one of the semi-annual or annual monitoring events then the frequency of monitoring shall be returned to a quarterly basis.

d. BACT for fugitive leaks of VOC also includes an emission limitation not to exceed 99.38 tons per rolling 12-month period from fugitive leaks from all process units and equipment for the entire facility.

e. The permittee shall employ BACT for fugitive leaks of GHGs. BACT has been determined to be the following:

i. an LDAR program for leaks of methane from equipment and piping components in tail gas (fuel gas) and natural gas service. The LDAR program will involve sensory monitoring methods for leaks as outlined in c)(1);

ii. methane contained in leaks associated with fugitive VOCs will be minimized by the implementation of BACT for fugitive leaks of VOC.

iii. CO_2e emissions from leaks of methane from equipment and piping components in tail gas (fuel gas) and natural gas service at the entire facility shall not exceed 35 tons per rolling 12-month period.

f. BAT requirements for VOC emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20. It should be noted that emissions of GHG are not subject to BAT under OAC 3745-31-34(E).

c) Operational Restrictions

(1) The permittee shall develop and implement a LDAR program designed to monitor and repair leaks of methane from equipment and piping components in tail gas (fuel gas) and natural gas service, including connectors, flanges, block valves, control valves, pressure relief valves, pressure gauges, temperature gauges, flow meters, and sample connections. The LDAR program shall include the following elements:

a. leaks shall be determined using sensory monitoring consisting of auditory, visual, and olfactory (AVO) walk-through inspections;

b. inspections of equipment and piping components in tail gas and natural gas service shall be conducted at a minimum frequency of one (1) time every twenty-four (24) hours to determine if a leak exists;

c. the program shall require that the leaking component is repaired as soon as practical but not later than 30 calendar days after the leak is detected;

d. the program shall allow for delay of repair of a leaking component if repair is technically infeasible without a shutdown or it is determined that emissions resulting from immediate repair would be greater than the fugitive emissions likely to result from delay of repair. Repair of the leaking component must be completed by the end of the next shutdown;

e. the program shall follow the Monitoring and Record Keeping requirements described in paragraphs d)(1) and d)(2) of this permit.

(2) This permit utilizes incorporation by reference for the following operational restrictions:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

b. See 40 CFR Part 61, Subpart J (40 CFR 61.110 -112).

c. See 40 CFR Part 61, Subpart V (40 CFR 61.240 -247).

d. See 40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999).

e. See 40 CFR Part 63, Subpart UU* (40 CFR 63.1019 -1039).

f. See 40 CFR Part 63, Subpart H* (40 CFR 63. 63.160 – 183).

*The requirements of these rules shall include the implementation of enhanced connector monitoring as applicable (see b)(2)c.).

(3) This term and condition outlines operational restrictions for a leak detection and repair program developed and implemented in accordance with OAC rule 3745-21-09(DD):

a. When a leak is detected the following procedures shall be followed:

i. a weatherproof identification tag with the equipment identification number and the date shall be immediately attached to the leaking equipment;

ii. a record of the leak, the date it was first detected, and any attempt to repair the leak and date is entered into the leak repair log;

iii. an identification tag that was attached to a leaking valve “in gas/vapor service” or “in light liquid service” may be removed only after the valve is repaired and found to have no leaks for two consecutive months; and

iv. an identification tag attached to leaking equipment that is exempted from the monitoring requirements of OAC 3745-21-09(DD)(2)(b) may be removed immediately following the repair of the leak.

b. Repair of a leak shall be attempted no later than 5 calendar days after it is detected, where practicable, and shall include, but not limited to, the following best maintenance practices:

i. tightening of bonnet bolts;

ii. replacement of bonnet bolts;

iii. tightening of packing gland nuts; and

iv. injection of lubricant into lubricated packing.

c. Except where meeting one of the conditions defined in OAC 3745-21-09(DD)(11), where a delay in repair is allowed, a leak shall be repaired as soon as practicable, but no later than 15 calendar days after it is detected. Leaking

equipment shall be deemed repaired if the maximum VOC concentration is measured to be less than 10,000 ppmv.

d. Each compressor shall be equipped with a seal that has a barrier fluid system and sensor which comply with the requirements specified in OAC 3745-21-09(DD)(8), with the following exceptions:

i. any compressor designated for "no detectable emissions", and meeting the requirements of OAC 3745-21-09 (DD)(7).

ii. any compressors equipped with a closed vent system capable of capturing and transporting any leakage from the compressor seal to control equipment, where the closed vent system and the control equipment comply with the requirements specified in OAC 3745-21-09(DD)(9) and (DD)(10).

iii. any reciprocating compressor that meets the following conditions:

(a) the compressor was installed prior to May 9, 1986; and

(b) the permittee demonstrates, to the satisfaction of the Director, that recasting the compressor distance piece or replacing the compressor are the only options available to bring it into compliance with the requirements to equip it with a seal with a barrier fluid system and sensor.

e. Except as otherwise provided below, any pressure relief device "in gas/vapor service" in the process unit shall comply with the following requirements:

i. Except during pressure releases, the pressure relief device shall be operated with "no detectable emissions", as indicated by an instrument reading of less than 500 ppmv above background, as measured by the method specified in OAC 3745-21-10(F)

ii. No later than 5 calendar days after a pressure release, a pressure relief device shall be tested to confirm the condition of "no detectable emissions" in accordance with the method specified in OAC 3745-21-10(F).

iii. Except for a delay of repair as provided in OAC 3745-21-09(DD)(11), a pressure relief device shall be returned to a condition of "no detectable emissions" as soon as practicable, but no later than 5 calendar days after a pressure release.

Any pressure relief device that is equipped with a closed vent system capable of capturing and transporting leakage through the pressure relief device to control equipment meeting the requirements specified in OAC 3745-21-09(DD)(9) and (DD)(10) is excluded from these requirements.

f. With the exception of an "in-situ sampling system" (a non-extractive sampler or an in-line sampler), each sampling connection system in the process unit shall be equipped with a closed purge system or a closed vent system that meets one of the following requirements:

i. the purged process fluid is returned directly to the process line with zero VOC emissions to the ambient air;

ii. the purged process fluid is collected and recycled with zero VOC emissions to the ambient air; or

iii. the closed purge system or closed vent system is designed and operated to capture and transport all the purged process fluid to control equipment that meet the control equipment requirements specified in OAC 3745-21-09(DD)(10).

g. Each open-ended valve or line in the process unit shall be equipped with a cap, blind flange, plug, or second valve which shall comply with the following requirements:

i. Except during operations requiring the flow of process fluid through the open-ended valve or line, the cap, blind flange, plug, or second valve shall seal the open end of the open-ended valve or line.

ii. If equipped with a second valve, the open-ended valve or line shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

iii. A bleed valve or line from a double block and bleed system may remain open during operations that require venting the line between the block valves, but the line/valve shall be sealed (as in "i" above) at all other times.

h. A pump or compressor equipped with a seal that has a barrier fluid system and sensor, which are employed to meet the requirements of OAC 3745-21-09(DD)(2)(d)(ii) for a pump or 3745-21-09(DD)(3)(a) and (b) for a compressor, shall be operated and maintained to comply with the following requirements.

i. The barrier fluid system shall meet one of the three following conditions:

(a) The barrier fluid system is operated with a barrier fluid at a pressure that is greater, at all times, than the stuffing box pressure of the pump or compressor.

(b) The barrier fluid system is equipped with a barrier fluid degassing reservoir that is connected by a closed vent system to control equipment and the closed vent system and control equipment comply with the requirements specified in OAC 3745-21-09(DD)(9) and (DD)(10).

(c) The barrier fluid system is equipped with a system that purges the barrier fluid into a process stream with zero VOC emissions to the ambient air.

ii. The barrier fluid system shall be "in heavy liquid service" or shall not be "in VOC service".

iii. The barrier fluid system shall be equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both, based on design criteria and operating experience of the permittee.

i. A delay of the repair of a detected leak or a delay in returning a pressure relief valve/device to a condition of "no detectable emissions" shall be allowed only if complying with the following requirements:

i. A delay of repair shall be allowed if the repair is technically infeasible without shutdown of the process unit. However, the repair shall occur before the end of the next process unit shutdown.

ii. A delay of repair shall be allowed for a piece of equipment that is isolated from the process and that does not remain "in VOC service" (for example, isolated from the process and properly purged).

iii. A delay of repair for a valve shall be allowed if:

(a) it can be demonstrated that the emissions from purged material resulting from immediate repair is greater than the emissions likely to result from delay of repair; and

(b) the purged material is collected and destroyed or recovered in control equipment that meets the requirements specified in OAC 3745-21-09(DD)(10).

iv. A delay of repair for a valve beyond a process unit shutdown shall be allowed if:

(a) a valve assembly replacement is necessary during the process unit shutdown, and

(b) the valve assembly supplies have been depleted, and

(c) valve assembly supplies had been sufficiently stocked before the supplies were depleted.

A delay of repair beyond the next process unit shutdown shall not be allowed for the valve unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

v. A delay of repair for a pump shall be allowed if:

(a) the repair requires the use of a dual mechanical seal system and associated barrier fluid system; and

(b) the repair is completed as soon as practicable, but no later than 6 months after the leak was detected.

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall perform AVO walk-through inspections a minimum of one (1) time every twenty-four (24) hours to detect possible leaks of methane from equipment and piping components in tail gas (fuel gas) and natural gas service. Results of the AVO inspections shall be maintained in an operations log and include the following:

a. the date and time the inspection was conducted;

b. the name of the employee conducting the leak check;

c. the identification of any equipment/piping component that was determined to be leaking (company ID and component type (flange, valve, etc.);

d. if applicable, reason for any delayed repairs; and

e. the date the equipment/piping component was repaired and determined to no longer be leaking.

(2) The records associated with the leak detection and repair program shall be maintained for at least 5 years and shall be made available to the Director or his representative upon verbal or written request.

(3) This permit utilizes incorporation by reference for the following monitoring and record keeping requirements:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

b. See 40 CFR Part 61, Subpart J (40 CFR 61.110 -112).

c. See 40 CFR Part 61, Subpart V (40 CFR 61.240 -247).

d. See 40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999).

e. See 40 CFR Part 63, Subpart UU* (40 CFR 63.1019 -1039).

f. See 40 CFR Part 63, Subpart H* (40 CFR 63. 63.160 – 183).

*The requirements of these rules shall include the implementation of enhanced connector monitoring as applicable (see b)(2)c.).

(4) This term and condition outlines monitoring and record keeping for a leak detection and repair program developed and implemented in accordance with OAC rule 3745-21-09(DD):

a. Except as otherwise provided in OAC 3745-21-09(DD)(2)(c) and (DD)(2)(d), equipment shall be monitored for leaks in accordance with the method specified OAC 3745-21-10(F) and as follows:

i. Any pump "in light liquid service" shall be monitored monthly.

ii. Any valve "in gas/vapor service" or "in light liquid service" shall be monitored monthly, except that quarterly monitoring may be employed where no leaks are detected during two consecutive months. Quarterly monitoring may begin with the next calendar quarter following the two consecutive months of no detected leaks. Monitoring shall be conducted in the first month of each calendar quarter; and quarterly monitoring may continue until a leak is detected, at which time monitoring shall again be employed monthly.

iii. The following equipment shall be monitored within 5 calendar days after evidence of a leak or potential leak from the equipment by visual, audible, olfactory, or other detection method:

(a) a pump "in heavy liquid service";

(b) a valve "in heavy liquid service";

(c) a pressure relief device "in light liquid service" or "in heavy liquid service"; and

(d) a flange or other connector.

iv. Any equipment in which a leak is detected, as defined in OAC 3745-21-09(DD)(2)(g), shall be monitored within 5 working days after each attempt to repair it, unless the equipment was not successfully repaired.

b. For any valve "in gas/vapor service" or "in light liquid service", an alternative monitoring schedule may be employed, in lieu of the monitoring schedule specified in OAC 3745-21-09(DD)(2)(b)(ii), above, if meeting one of the three following requirements:

i. The valve is designated as "difficult to monitor" and is monitored once each calendar year if meeting all of the following conditions:

(a) construction of the process unit commenced prior to May 9, 1986;

(b) the permittee demonstrates that the valve cannot be monitored without elevating the monitoring personnel more than 6 feet above a support surface; and

(c) the permittee has a written plan that requires monitoring of the valve at least once per year.

ii. The valve is designated as "unsafe to monitor" and is monitored as frequently as practical during times when it is safe to monitor, provided the following conditions are met:

(a) the permittee demonstrates that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of monitoring on a monthly basis; and

(b) the permittee adheres to a written plan that requires monitoring of the valve as frequently as practical during times when it is safe to monitor.

iii. The valve qualifies for an alternative monitoring schedule based on a "skip period" as allowed per OAC 3745-21-09(DD)(12).

c. The permittee may elect to implement an alternative monitoring schedule, to that of OAC 3745-21-09(DD)(2)(b)(ii) and as identified below, for the process unit valves if the following conditions are met:

i. no more than 2.0% of the process unit valves are leaking;

ii. the permittee notifies the Director (the appropriate district office or local air agency) prior to implementing the alternative monitoring schedule; and such notification identifies:

(a) which valves will be subject to the alternative monitoring schedule; and

(b) which work practice, identified in OAC 3745-21-09(DD)(12)(e), will be implemented;

iii. the permittee monitors the valves initially monthly, to quarterly, as allowed and according to the requirements specified in OAC 3745-21-09(DD)(2)(b)(ii); and

iv. the valves continue to meet with the conditions specified in OAC 3745-21-09(DD)(2)(g) to (DD)(2)(m).

If meeting all of the above conditions ("i" through "iv"), one of the following monitoring periods for valve leak detection may be implemented:

v. after two consecutive quarterly leak detection periods with 2.0% or less of the process unit valves leaking, a monitoring program may begin in which the first quarter of every two consecutive quarterly leak detection periods is skipped; or

vi. after 5 consecutive quarterly leak detection periods with 2.0% or less of the process unit valves leaking, a monitoring program may begin in which the first three quarters of every four consecutive quarterly periods is skipped.

The alternative monitoring schedule shall be based on skipping quarterly monitoring periods. Any valve "in vacuum service", "in heavy liquid service", or not "in VOC service" shall be excluded from the monitoring schedule. If the percentage of valves leaking from the process unit becomes greater than 2.0%, the permittee shall again comply with the monitoring requirements specified in OAC 3745-21-09(DD)(2)(b)(ii), but may revert to this alternative monitoring schedule after meeting and documenting all of the above requirements.

d. The percentage of valves leaking, used to qualify for "skipped period" alternative monitoring schedule, shall be determined as the sum of the number of those valves found leaking during any portion of the current monitoring period and the number of those valves found leaking during a previous monitoring period for which repair has been delayed during the current monitoring period, divided by the total number of valves, and multiplied by 100.

e. The following information shall be recorded in a log, that is kept in a readily accessible location, if the "skipped period" alternative monitoring schedule for leak detection of process unit valves is established:

   i. the identification numbers of the valves subject to the alternative monitoring schedule;

   ii. the schedule established for monitoring the subject valves;

   iii. the valves exempt from the alternative monitoring schedule and reason for the exemption, i.e., "in vacuum service", "in heavy liquid service", or not "in VOC service";

   iv. the percentage of valves leaking during each monitoring period; and

   v. the maximum instrument reading and date each valve was monitored.

f. The permittee may elect to implement an alternative monitoring schedule to that of OAC 3745-21-09(DD)(2)(b)(ii) for the process unit valves, as provided in OAC 3745-21-09 (DD)(2)(d)(v), if the following conditions are met:

   i. it can be demonstrated that no more than 2.0% of the process unit valves are leaking;

   ii. the permittee notifies the Director (the appropriate district office or local air agency) prior to implementing the alternative monitoring standard;

   iii. the demonstration of compliance to document that the percentage of valves leaking does not exceed 2.0% is conducted initially upon implementation and annually thereafter and as follows:

      (a) all valves subject to the alternative monitoring standard shall be monitored for leaks within a one-week period by the method specified in OAC 3745-21-10(F);

(b) any leak detected and measured with an instrument reading of 10,000 ppmv or greater shall be recorded as a leak; and

(c) the percentage of valves leaking shall be determined as the number of valves for which a leak is detected, divided by the number of valves monitored, and multiplied by 100.

All valves "in gas/vapor service" or "in light liquid service" in the process unit shall be subject to this alternative monitoring standard, except for valves not "in VOC service", valves "in vacuum service", and valves which are designated as unsafe to monitor as provided in OAC 3745-21-09(DD)(2)(c)(ii).

g. When a leak is detected as described above, the leaking valve shall be repaired in accordance with OAC 3745-21-09(DD)(2)(h) and (DD)(2)(i). If the percentage of valves leaking from the process unit becomes greater than 2.0%, the permittee shall again comply with the monitoring requirements specified in OAC 3745-21-09(DD)(2)(b)(ii), but may revert to this alternative monitoring schedule after meeting and documenting all of the above requirements.

h. The following equipment is excluded from the monitoring requirements of OAC 3745-21-09(DD)(2)(b):

i. any pump that has no externally actuated shaft penetrating the pump housing and that is designated for no detectable emissions as provided in OAC 3745-21-09(DD)(7);

ii. any pump that is equipped with a dual mechanical seal which has a barrier fluid system and sensor that comply with the requirements specified in OAC 3745-21-09 (DD)(8);

iii. any pump that is equipped with a closed vent system capable of capturing and transporting any leakage from the pu mp seal to control equipment, provided the closed vent system and the control equipment comply with the requirements specified in OAC 3745-21-09(DD)(9) and (DD)(10);

iv. any valve that has no externally actuated stem penetrating the valve and that is designated for "no detectable emissions" as provided in OAC 3745-21-09(DD)(7); and

v. any valve that qualifies for the alternative monitoring standard based on the percentage of valves leaking, as provided in OAC 3745-21-09(DD)(13).

i. Any pump "in light liquid service" shall be checked by visual inspection each calendar week for indications of liquids dripping from the pump seal, unless the pump is equipped with a closed vent system capable of transporting any leakage from the pump seal to control equipment, and the closed vent system and control equipment comply with the requirements specified in OAC 3745-21-09(DD)(9) and (DD)(10).

j. Any sensor employed pursuant to OAC 3745-21-09(DD)(2)(d)(ii), for a pump equipped with a dual mechanical seal using a barrier fluid system and sensor; or a sensor employed pursuant to OAC 3745-21-09(DD)(3)(b), for a compressor equipped with a seal using a barrier fluid system and sensor; and complying with the requirements specified in OAC 3745-21-09(DD)(8), shall be checked daily, unless the sensor is equipped with an audible alarm.

k. A leak is detected when:

i. a concentration of 10,000 ppmv or greater is measured from a potential leak interface of any equipment, that is monitored for leaks using the method specified in OAC 3745-21-10(F);

ii. there is an indication of liquids dripping from the seal of a pump “in light liquid service”; or

iii. a sensor employed pursuant to OAC 3745-21-09(DD)(2)(d)(ii) or (DD)(3)(b) indicates failure of the seal system, the barrier fluid system, or both.

l. When a leak is detected, the following information shall be recorded in the leak repair log:

i. the identification number of the leaking equipment;

ii. for each leak required to be monitored, the identification numbers of the leak detection instrument and its operator;

iii. how the leak was detected, e.g., monitoring, visual inspection, odor detected, or sensor alarm/signal;

iv. the date on which the leak was detected and the date of each attempt to repair the leaking equipment;

v. the methods of repair applied in each attempt to repair the leak;

vi. one of the following entries within 5 working days after each attempt to repair the leaking equipment:

(a) “not monitored," denoting the leaking equipment was presumed to still be leaking and it was not monitored; or

(b) if the leaking equipment was monitored with a leak detection instrument, the maximum concentration that was measured as follows:

(i) the actual reading in ppmv; or

(ii) a record stating that the measured concentration was “below 10,000 ppmv”; or

(iii) a record stating that the measured concentration was "above 10,000 ppmv".

vii. if the leak is not repaired within 15 calendar days after the date on which it was detected:

(a) a record stating that repair was delayed and the reason for the delay;

(b) if repair is being delayed until the next process unit shutdown due to technical infeasibility of repair, the signature of the operator whose decision it was that repair is technically infeasible without a process unit shutdown;

(c) the expected date of successful repair of the leak; and

(d) the dates of process unit shutdowns that occur while the leaking equipment is unrepaired; and

viii. the date on which the leak was successfully repaired.

m. The leak repair log shall be kept in a readily accessible location and maintained by the operator of the process unit. Each record shall be retained in the log for a minimum of five years following the date on which it was recorded.

n. The following information shall be recorded for the/each process unit in a log that is kept in a readily accessible location:

i. a list of identification numbers for equipment subject to the requirements of OAC 3745-21-09(DD)(2) to (DD)(10);

ii. a list of identification numbers for equipment designated for "no detectable emissions" as provided in OAC 3745-21-09(DD)(7), and the signature of the permittee/operator authorizing the designation of each piece of equipment;

iii. a list of identification numbers for pressure relief devices subject to OAC 3745-21-09(DD)(4);

iv. a list of identification numbers for closed vent systems subject to OAC 3745-21-09(DD)(9);

v. for compliance tests required under OAC 3745-21-09(DD)(4)(c), (DD)(7)(c), and (DD)(9)(c):

(a) the date each compliance test is conducted;

(b) the background VOC emissions level measured during each compliance test; and

(c) the maximum instrument reading measured at the equipment during each compliance test;

vi. the following information pertaining to valves subject to an alternative monitoring schedule, as provided in OAC 3745-21-09(DD)(2)(c):

(a) a list of identification numbers for valves designated as unsafe to monitor, an explanation for each valve stating why the valve is unsafe to monitor, and the plan for monitoring each valve;

(b) a list of identification numbers for valves designated as difficult to monitor, an explanation for each valve stating why the valve is difficult to monitor, and the schedule for monitoring each valve; and

(c) a list of identification numbers for valves subject to the alternative monitoring schedule based on a “skip period”, a schedule for monitoring these valves, and the percentage of valves leaking during each monitoring period;

vii. the following information pertaining to closed vent systems and control equipment meeting the requirements of OAC 3745-21-09(DD)(9) and (DD)(10):

(a) detailed schematics, design specifications, and piping and instrumentation diagrams for the closed vent systems and collection and control equipment;

(b) the dates and descriptions of any changes in the design specifications above;

(c) a description of the parameter(s) monitored, as required in OAC 3745-21-09(DD)(10)(d), to ensure that the control equipment is operated and maintained in conformance with its design, and the reason for selecting the parameter(s);

(d) periods when the closed vent systems and control equipment are not operated as designed, including periods when a flare pilot light does not have a flame; and

(e) dates of startups and shutdowns of the closed vent systems and control equipment;

viii. the following information pertaining to barrier fluid systems and sensors described in OAC 3745-21-09(DD)(8):

(a) a list of identification numbers of pumps and compressors equipped with such barrier fluid systems and sensors;

(b) the criteria that indicate failure of the seal system, the barrier fluid system, or both, as required in OAC 3745-21-09(DD)(8)(d) and an explanation of the criteria; and

(c) any changes to such criteria and the reasons for the changes;

ix. the following information for use in determining an exemption for the process unit as provided in OAC 3745-21-09(DD)(17)(a):

(a) an analysis demonstrating the design capacity of the process unit;

(b) a statement listing the feed and raw materials and products from the process unit and an analysis demonstrating whether these chemicals are heavy liquids or beverage alcohols; or

(c) an analysis demonstrating that equipment that is documented as "not in VOC service" meets this condition; and

x. the following information pertaining to specific equipment that are exempt as provided in OAC 3745-21-09(DD)(17)(b):

(a) a list of identification numbers of equipment "in vacuum service";

(b) a list of identification numbers of equipment "not in VOC service" and the information or data used to demonstrate this; and

(c) a list of equipment subject to an equivalent emission requirement that is approved by the Director pursuant to OAC 3745-21-09 (DD)(16).

One recordkeeping system may be used to comply with the recordkeeping requirements for multiple process units provided the system identifies each process unit to which each record pertains.

xi. The following facility process units are exempted from the requirements of OAC 3745-21-09(DD)(2) to (DD)(6). Records shall be maintained to identify and document the process unit equipment meeting these requirements:

(a) any process unit that has a design capacity to produce less than 1,100 tons per year;

(b) any process unit that produces only heavy liquid chemicals from heavy liquid feed or raw materials;

(c) any process unit that produces beverage alcohol;

(d) any process unit that has no equipment "in VOC service" as determined in accordance with OAC 3745-21-10(O)(2); and

(e) any process unit at a petroleum refinery, as defined in OAC 3745-21-01(E)(15).

o. The following process equipment are exempt from the requirements of OAC 3745-21-09(DD)(2) to (DD)(6). Records shall be maintained to identify and document the process unit equipment meeting these requirements:

i. any equipment "not in VOC service", as determined in accordance with OAC 3745-21-10(O)(2);

ii. any equipment "in vacuum service"; and

iii. any equipment subject to an equivalent emission limitation as provided in OAC 3745-21-09(DD)(16).

e) Reporting Requirements

(1) The permittee shall submit semiannual written reports that identify the following information from data collected by the LDAR program for leaks of methane shall be submitted to the Director by the first day of February and August and shall include the following information for each preceding semiannual period of operations:

a. for each AVO walk-through inspection that occurred during the semiannual period, the permittee shall submit the following information from data collected by LDAR program:

i. the date of the inspection;

ii. the company ID and equipment/piping component type (flange, valve, etc.) of each leaking equipment/piping component;

iii. a list of all equipment/ piping components that were not repaired within 30 days after inspection identified the equipment/piping component to be leaking; and

iv. a list of all equipment/piping components involving a delay of repair and the reason for the delay.

(2) This permit utilizes incorporation by reference for the following reporting requirements:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

b. See 40 CFR Part 61, Subpart J (40 CFR 61.110 -112).

c. See 40 CFR Part 61, Subpart V (40 CFR 61.240 -247).

d. See 40 CFR Part 63, Subpart SS (40 CFR 63.980 – 63.999).

e. See 40 CFR Part 63, Subpart UU* (40 CFR 63.1019 -1039).

f. See 40 CFR Part 63, Subpart H* (40 CFR 63. 63.160 – 183).

*The requirements of these rules shall include the implementation of enhanced connector monitoring as applicable (see b)(2)c.).

(3) This term and condition outlines reporting requirements for a leak detection and repair program developed and implemented in accordance with OAC rule 3745-21-09(DD):

a. Semiannual reports shall be submitted to the Director by the first day of February and August and shall include the following information for each preceding semiannual period of operations:

i. the process unit identification;

ii. the number of pumps "in light liquid service" associated with the process unit, excluding:

(a) pumps that have no externally actuated shaft penetrating the pump housing and designated for "no detectable emissions"; and

(b) pumps equipped with a closed vent system capable of capturing and transporting leakage from the pump seal to control equipment meeting the requirements of OAC 3745-21-09(DD)(9) and (DD)(10);

iii. the number of valves "in gas/vapor service" or "in light liquid service" associated with the process unit, excluding:

(a) valves that have no externally actuated stem penetrating the valve and designated for "no detectable emission"; and

(b) valves qualified for the alternative monitoring standard based on the percentage of valves leaking, under the provision of OAC 3745-21-09(DD)(13);

iv. the number of compressors associated with the process unit, excluding:

(a) compressors designated for and meeting the requirements for "no detectable emissions";

(b) compressors equipped with a closed vent system capable of capturing and transporting leakage from the compressor seal to control equipment meeting the requirements of OAC 3745-21-09(DD)(9) and (DD)(10); and/or

(c) reciprocating compressors installed prior to 5/9/86, where it can be demonstrated that recasting or replacing the compressor would be the only means of complying with the requirement to equip it with a seal with a barrier fluid system and sensor;

v. for each month during the semiannual period:

(a) the number of pumps “in light liquid service” for which leaks were detected (as required in this permit);

(b) the number of pumps “in light liquid service” for which leaks were not repaired within 15 calendar days after the date of leak detection;

(c) the number of valves “in gas/vapor service” or “in light liquid service” for which leaks were detected (as required in this permit);

(d) the number of valves “in gas/vapor service” or “in light liquid service” for which leaks were not repaired within 15 calendar days after the date of leak detection;

(e) the number of compressors for which leaks were detected (as required in this permit);

(f) the number of compressors for which leaks were not repaired within 15 calendar days after the date of leak detection; and

(g) for each delay of repair allowed pursuant to OAC 3745-21-09(DD)(11), the reason for the delay;

vi. the dates of process unit shutdowns that occurred within the semiannual period; and

vii. the results of compliance tests for equipment identified as having “no detectable emissions”, along with the associated equipment identification numbers from the compliance log.

Semiannual reports shall be submitted to the appropriate Ohio EPA district office or local air agency by the first day of February and August and shall include information for the preceding semiannual period.

b. The permittee shall notify the appropriate Ohio EPA district office or local air agency of the intent-to-test the process control equipment not less than 30 days before the proposed initiation of the testing. The following information shall be included in the notification

i. a statement indicating the purpose of the proposed test and the applicable paragraph of OAC 3745-21-09 for which compliance will be demonstrated;

ii. a detailed description of the process unit and control device to be tested;

iii. a detailed description of the test procedures, equipment and sampling sites; and

iv. a timetable, setting forth the dates on which:

(a) the testing will be conducted; and

(b) the final test report will be submitted.

The results of such compliance tests shall be reported to the appropriate Ohio EPA district office or local air agency within 30 days following the test date.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emission Limitation:

VOC emissions from fugitive leaks from all process units and equipment at the entire facility shall not exceed 99.38 tons per rolling 12-month period.

Applicable Compliance Method:

Compliance with the annual emission limitation is demonstrated based upon the following calculation:

$$E = \sum_{i=1}^{n} (Ci)\,(EFi)\left(1 - \left(\frac{CEi}{100}\right)\right)\left(\frac{8{,}760\ hrs}{12\ months}\right)\left(\frac{Ton}{907.185\ Kg}\right)$$

Where:

E = total tons of VOC per rolling 12-month period.

Ci = component type i.

EFi = VOC* emission factor (in Kg/hr/source) for equipment and service type from U.S. EPA's "Protocol for Equipment Leak Emission Estimates" (EPA-453/R-95-017 - November 1995), Table 2-1, for synthetic organic chemical manufacturing industry (SOCMI).

CEi = control efficiency (%) for application of LDAR program. Efficiencies based on TCEQ LDAR program 28VHP (TCEQ – Control Efficiencies for TCEQ Leak Detection and Repair Programs, Revised 07/11 (APDB 6129v2)).

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period.

*Conservatively assumes 100% of the SOCMI emission factors in total organic compounds (TOC) are VOC (e.g. no revision of TOC emissions based on % concentration of VOC).

b. Emission Limitation:

CO_2e emissions from leaks of methane from equipment and piping components in tail gas (fuel gas) and natural gas service at the entire facility shall not exceed 35 tons per rolling 12-month period.

Applicable Compliance Method:

Compliance with the annual emission limitation is demonstrated based upon the following calculation:

$$E = \sum_{i=1}^{n} (Ci)\,(EFi)\left(1 - \left(\frac{CEi}{100}\right)\right)\left(\frac{8{,}760\ hrs}{12\ months}\right)\left(\frac{Ton}{907.185\ Kg}\right) \quad (25)$$

Where:

E = total tons of CO_2e per rolling 12-month period.

Ci = component type i.

EFi = VOC* emission factor (in Kg/hr/source) for equipment and service type from U.S. EPA's "Protocol for Equipment Leak Emission Estimates" (EPA-453/R-95-017 - November 1995), Table 2-1, for synthetic organic chemical manufacturing industry (SOCMI).

CEi = control efficiency (%) for application of LDAR program. Efficiencies based on TCEQ LDAR program 28VHP (TCEQ – Control Efficiencies for TCEQ Leak Detection and Repair Programs, Revised 07/11 (APDB 6129v2)).

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period.

25 = Global warming potential of methane for calculating CO_2e (40 CFR Part 98, Subpart A, Table A-1.

*Conservatively assumes 100% of the SOCMI emission factors in total organic compounds (TOC) are methane (CH_4).

(2) This term and condition outlines the testing method for the determination of equipment "in VOC service" and "in light liquid service" for a leak detection and repair program developed and implemented in accordance with OAC rule 3745-21-09(DD):

a. Any piece of equipment is presumed to be "in VOC service", unless the permittee demonstrates that the piece of equipment is "not in VOC service" according to the following provisions:

i. The piece of equipment is considered "not in VOC service" if it can be determined that the VOC content of the process fluid, which is contained in or contacts the piece of equipment, can be reasonably expected never to exceed 10% by weight.

ii. Procedures that conform to the general methods described in ASTM E168-99(2004), ASTM E169-04, and ASTM E260-73 shall be used to determine the VOC content of a process fluid.

iii. The permittee may use engineering judgment rather than the above ASTM methods, where it can be clearly demonstrated that the VOC

content of a process fluid does not exceed 10% by weight. In the event the Ohio environmental protection agency or the U.S. EPA has a disagreement with an engineering judgment, the appropriate ASTM method shall be used to resolve the disagreement.

b. A piece of equipment is "in light liquid service" if it contains or is in contact with a process fluid that meets all of the following conditions:

i. The process fluid is a liquid at operating conditions.

ii. The vapor pressure of one or more of the pure components within the process fluid is greater than 0.04 pound per square inch at 68 degrees Fahrenheit.

iii. The total concentration of the pure components having a vapor pressure greater than 0.04 pound per square inch at 68 degrees Fahrenheit is equal to or greater than 20% by weight.

Vapor pressures may be obtained from standard reference texts or may be determined by the method in ASTM D2879-70.

g) Miscellaneous Requirements

(1) None.

13. J001, Light and Heavy Pygas Railcar Loading

Operations, Property and/or Equipment Description:

Loading of railcars (2 loading arms) with light and heavy pygas controlled by the OSBL thermal oxidizer (P001 or P002).

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)c., b)(2)e. and b)(2)f.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20	Best Available Control Technology (BACT) for volatile organic compounds (VOC) See b)(2)a.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)c. and b)(2)d.
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)e. and b)(2)f.
d.	OAC rule 3745-21-07	See b)(2)g.
e.	40 CFR Part 60, Subpart VVa (40 CFR Part 60.480a – 60.489a) [In accordance with 40 CFR 60.480a, this emissions unit involves equipment in synthetic organic chemicals manufacturing subject to the requirements specified in this section.]	Leak detection and repair for equipment within a process unit that produces chemicals listed in §60.489a [40 CFR 60.482-1a through 60.482-11a] See b)(2)b.
f.	40 CFR Part 60, Subpart A (40 CFR 60.1 - 60.19)	All of the General Provisions of 40 CFR Part 60, Subpart A are applicable except for the following: §60.8(d) does not apply to 40 CFR Subpart VVa [§60.487a(e)]

(2) Additional Terms and Conditions

a. BACT requirements for heavy and light pygas railcar loading has been determined to be the following:

i. use of thermal oxidizer (TO) achieving a destruction efficiency of ≥99.5% for VOC emissions.

Note: The TO controlling heavy and light pygas railcar loading operations is permitted as a separate and individual emissions unit (emissions unit P001 or P002). For efficient permitting structure, the applicable operational restrictions, monitoring, record keeping, reporting, and testing associated with TO control are contained within the requirements of emissions unit P001 and P002.

b. The following regulations establish requirements for component equipment leak control and repair for VOC from the heavy and light pygas railcar loading operations:

(a) OAC rule 3745-31-10 through 20; and

(b) 40 CFR Part 60, Subpart VVa.

Note: A separate emissions unit (P807) associated with fugitive leaks of VOC, HAP*, VHAP/Benzene*, and GHGs* from all component equipment at the facility subject to the leak control and repair regulations above has been established. For efficient permitting structure, the applicable requirements (limitations, operational restrictions, monitoring, record keeping, reporting, and testing) associated with equipment leak control and repair for VOC, HAP*, VHAP/Benzene*, and GHGs* are contained within the requirements of emissions unit P807.

*It should be noted that heavy and light pygas railcar loading operations are not subject to regulations for HAP under 40 CFR Part 63, VHAP/Benzene under 40 CFR Part 61 or GHGs under OAC rule 3745-31-10 through 20.

c. BAT requirements for VOC under OAC rule 3745-31-05(A)(3) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of VOC from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable).

f. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

g. This emissions unit is not subject to OAC rule 3745-21-07 in accordance with OAC rule 3745-21-07(M)(3)(c).

c) Operational Restrictions

(1) This permit utilizes incorporation by reference for the following operational restrictions:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

*Operational restrictions associated with leak control and repair for heavy and light pygas railcar loading are contained within the requirements of emissions unit P807.

d) Monitoring and/or Recordkeeping Requirements

(1) This permit utilizes incorporation by reference for the following monitoring and record keeping requirements:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

*Monitoring and record keeping associated with leak control and repair for heavy and light pygas railcar loading are contained within the requirements of emissions unit P807.

(2) This permit utilizes incorporation by reference for the following reporting requirements:

a. See 40 CFR Part 60, Subpart VVa* (40 CFR 60.480a-489a).

*Reporting requirements associated with leak control and repair for heavy and light pygas railcar loading are contained within the requirements of emissions unit P807.

e) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitation:

Use of TO achieving a destruction efficiency of $\geq$99.5% for VOC emissions.

Applicable Compliance Method:

Refer to emissions unit P001 and P002 for applicable compliance methods for the above emission limitation.

f) Miscellaneous Requirements

(1) None.

14. P901, HDPE Railcar Loading 1

Operations, Property and/or Equipment Description:

Railcar loading of high-density polyethylene (HDPE) pellets controlled with baghouse

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)c., b)(2)d. and b)(2)e.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20	Best Available Control Technology (BACT) for particulate matter 10 microns or less in size (PM_{10}) and particulate matter 2.5 microns or less in size ($PM_{2.5}$) See b)(2)a.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)b. and b)(2)c.
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)d. and b)(2)e.
d.	OAC rule 3745-17-11(B)(1)	See b)(2)f.
e.	OAC rule 3745-17-07(A)	See b)(2)f.

The HDPE and LLDPE/HDPE railcar loading operations (emissions unit P901 & P902) share a pellet cleaning package operation (filter vent PE-RPC). Limitations and requirements for the pellet cleaning package operation are contained within the terms and conditions below and are also contained in the terms and conditions of emissions unit P902).

(2) Additional Terms and Conditions

a. BACT requirements for high density polyethylene (HDPE) pellet railcar loading for $PM_{10}/PM_{2.5}$* emissions has been determined to be the following:

i. use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for $PM_{10}/PM_{2.5}$) for the following process loading vents:

(a) PE Railcar Loading Bin (PE1-21):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(b) PE Railcar Loading Bin (PE2-21):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(c) PE Railcar Loading (PE1-22):

(i) 0.001 lb/hr and 0.002 ton per rolling 12-month period.

(d) PE Railcar Loading (PE2-22):

(i) 0.001 lb/hr and 0.002 ton per rolling 12-month period.

ii. a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for $PM_{10}/PM_{2.5}$) for the following process loading vents:

(a) PE Pellet Elutricator & Cyclone Separator (PE1-20):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(b) PE Pellet Elutricator & Cyclone Separator (PE2-20):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

iii. use of fabric filtration control for achieving a maximum outlet concentration of 0.001 gr/dscf for PM_{10}, 0.0005 gr/dscf for $PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for PM_{10} and $PM_{2.5}$) for the pellet cleaning package vent (PE-RPC):

(a) PM_{10}: 0.009 lb/hr and 0.038 ton per rolling 12-month period;

(b) $PM_{2.5}$: 0.004 lb/hr and 0.019 ton per rolling 12-month period.

iv. visible particulate emissions from the stacks for this emissions unit identified in b)(2)a. shall not exceed five percent opacity, as a six-minute average.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ are considered equivalent for permitting purposes.

b. BAT requirements for PM_{10} and $PM_{2.5}$ under OAC rule 3745-31-05(A)(3) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

d. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of $PM_{10}/PM_{2.5}$, from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable). It should be noted that emissions of PE are not subject to BAT under OAC rule 3745-31-05(A)(3).

e. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

f. The emission limitation specified by this rule is less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c) Operational Restrictions

(1) None.

d) Monitoring and/or Recordkeeping Requirements

(2) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stacks for this emissions unit identified in b)(2)a. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. whether the emissions are representative of normal operations;

c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

d. the total duration of any visible emissions incident; and

e. any corrective actions taken to eliminate the visible emissions.

e) Reporting Requirements

(1) The permittee shall submit semiannual written reports that identify:

a. all days during which any visible particulate emissions were observed from the stacks for this emissions unit identified in b)(2)a.; and

b. any corrective actions taken to minimize or eliminate the visible particulate emissions.

These reports shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency) by January 31 and July 31 of each year and shall cover the previous 6-month period.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

$PM_{10}/PM_{2.5}$ emission limitations of 0.002 gr/dscf and the lb/hr and tons per rolling 12-month period limitations (for $PM_{10}/PM_{2.5}$) indicated for the following process loading vents: .

(a) PE Pellet Elutricator & Cyclone Separator (PE1-20):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(b) PE Pellet Elutricator & Cyclone Separator (PE2-20):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(c) PE Railcar Loading Bin (PE1-21):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(d) PE Railcar Loading Bin (PE2-21):

(i) 0.08 lb/hr and 0.15 ton per rolling 12-month period.

(e) PE Railcar Loading (PE1-22):

(i) 0.001 lb/hr and 0.002 ton per rolling 12-month period.

(f) PE Railcar Loading (PE2-22):

(i) 0.001 lb/hr and 0.002 ton per rolling 12-month period.

Applicable Compliance Method:

The 0.002 gr/dscf was established in accordance with BACT requirements as the maximum outlet concentration standard for the application of fabric filtration control.

The maximum outlet concentration 0.002 gr $PM_{10}/PM_{2.5}$/dscf for the elutricator & cyclone separator vents was established in accordance with BACT requirements.

The lb/hr and tons per rolling 12-month period limitations were established by multiplying the emission limitation of 0.002 gr/dscf by the following maximum volumetric air flow rates in cubic feet per hour (cfh) and cubic feet per year (cfyr) and multiplying by lb/7,000 gr:

(a) PE Pellet Elutricator & Cyclone Separator (PE1-20):

(i) 294,739 cfh

(ii) 1,031,587,902 cfyr

(b) PE Pellet Elutricator & Cyclone Separator (PE2-20):

(i) 294,739 cfh

(ii) 1,031,587,902 cfyr

(c) PE Railcar Loading Bin (PE1-21):

(i) 294,739 cfh

(ii) 1,031,587,902 cfyr

(d) PE Railcar Loading Bin (PE2-21):

(i) 294,739 cfh

(ii) 1,031,587,902 cfyr

(e) PE Railcar Loading (PE1-22):

(i) 3,848 cfh

(ii) 13,467,192 cfyr

(f) PE Railcar Loading (PE2-22):

(i) 3,848 cfh

(ii) 13,467,192 cfyr

Maximum hourly volumetric air flows are based on a pellet-to-air ratio of 10 lb/lb (766 lb/lb for PE1-22 & PE2-22) and a maximum pellet loading rates of 100 metric tons per hour. If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

Maximum annual volumetric air flows are based on a pellet-to-air ratio of 10 lb/lb (766 lb/lb for PE1-22 & PE2-22) and a maximum pellet loading rate of 350,000 metric tons per year. Therefore, provided compliance is shown with the 0.002 gr/dscf limitation, compliance with the rolling 12-month limitations shall also be demonstrated.

b. Emissions Limitation:

Limitations of 0.001 gr/dscf for PM_{10}, 0.0005 gr/dscf for $PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for PM_{10} and $PM_{2.5}$) for the pellet cleaning package vent (PE-RPC):

(a) PM_{10}: 0.009 lb/hr and 0.038 ton per rolling 12-month period;

(b) $PM_{2.5}$: 0.004 lb/hr and 0.019 ton per rolling 12-month period.

Applicable Compliance Method:

The 0.001 gr/dscf for PM_{10} and 0.0005 gr/dscf for $PM_{2.5}$ were established in accordance with BACT requirements as the maximum outlet concentration standards for the application of fabric filtration control.

The lb/hr limitations were established by multiplying the emission limitation of 0.005 gr/dscf or 0.01 gr/dscf by the following maximum volumetric air flow rates (cfm) and multiplying by lb/7,000 gr and 60 min/hr:

The lb/hr limitations were established by multiplying the emission limitation of 0.001 gr/dscf for PM_{10} and 0.0005 gr/dscf for $PM_{2.5}$ by a maximum volumetric air flow rate of 60,000 cubic feet per hour and multiplying by lb/7,000 gr.

If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

The tons per rolling 12-month period limitations were established by multiplying the lb/hr limitations by a maximum operating schedule of 8,760 hours per year and dividing by 2,000 lbs/ton. Therefore, provided compliance is shown with the lb/hr limitations, compliance with the rolling 12-month limitations shall also be demonstrated.

c. Emissions Limitation:

Visible particulate emissions from the stacks for this emissions unit identified in b)(2)a. shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

If required, compliance shall be demonstrated using Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources").

g) Miscellaneous Requirements

(1) None.

15. P902, HDPE Railcar Loading 2

Operations, Property and/or Equipment Description:

Railcar loading of linear low-density polyethylene/high density polyethylene (LLDPE/HDPE) pellets controlled with baghouse. Loading operations include pellet cleaning package process.

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)c., b)(2)d. and b)(2)e.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20	Best Available Control Technology (BACT) for particulate matter 10 microns or less in size (PM_{10}) and particulate matter 2.5 microns or less in size ($PM_{2.5}$) See b)(2)a.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)b. and b)(2)c.
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)d. and b)(2)e.
d.	OAC rule 3745-17-11(B)(1)	See b)(2)f.
e.	OAC rule 3745-17-07(A)	See b)(2)f.

The HDPE and LLDPE/HDPE railcar loading operations (emissions unit P901 & P902) share a pellet cleaning package operation (filter vent PE-RPC). Limitations and requirements for the pellet cleaning package operation are contained within the terms and conditions below and are also contained in the terms and conditions of emissions unit P901).

(2) Additional Terms and Conditions

a. BACT requirements for linear low-density polyethylene high density polyethylene (LLDPE/HDPE) pellet railcar loading for $PM_{10}/PM_{2.5}$* emissions has been determined to be the following:

i. use of fabric filtration control for achieving a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations for (for $PM_{10}/PM_{2.5}$) the following process loading vents:

(a) PE Railcar Loading Bin (PE3-17):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(b) PE Railcar Loading Bin (PE4-17):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(c) PE Railcar Loading (PE3-18):

(i) 0.002 lb/hr and 0.003 ton per rolling 12-month period.

(d) PE Railcar Loading (PE4-18):

(i) 0.002 lb/hr and 0.003 ton per rolling 12-month period.

ii. a maximum outlet concentration of 0.002 gr/dscf for $PM_{10}/PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for $PM_{10}/PM_{2.5}$) for the following process loading vents:

(a) PE Pellet Elutricator & Cyclone Separator (PE3-16):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(b) PE Pellet Elutricator & Cyclone Separator (PE4-16):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

*All emissions of particulate matter are $PM_{10}/PM_{2.5}$ and the emission rates of PM_{10} and $PM_{2.5}$ from railcar process loading vents are considered equivalent for permitting purposes.

iii. use of fabric filtration control for achieving a maximum outlet concentration of 0.001 gr/dscf for PM_{10}, 0.0005 gr/dscf for $PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for PM_{10} and $PM_{2.5}$) for the pellet cleaning package vent (PE-RPC):

(a) PM_{10}: 0.009 lb/hr and 0.038 ton per rolling 12-month period;

(b) $PM_{2.5}$: 0.004 lb/hr and 0.019 ton per rolling 12-month period.

iv. visible particulate emissions from the stacks for this emissions unit identified in b)(2)a. shall not exceed five percent opacity, as a six-minute average.

b. BAT requirements for PM_{10} and $PM_{2.5}$ under OAC rule 3745-31-05(A)(3) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

d. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of $PM_{10}/PM_{2.5}$, from this air contaminant source since the potential to

emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable). It should be noted that emissions of PE are not subject to BAT under OAC rule 3745-31-05(A)(3).

e. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

f. The emission limitation specified by this rule is less stringent than BACT requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c) Operational Restrictions

(1) None.

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stacks for this emissions unit identified in b)(2)a. The presence or absence of any visible emissions for each individual stack shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

a. the color of the emissions;

b. whether the emissions are representative of normal operations;

c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

d. the total duration of any visible emissions incident; and

e. any corrective actions taken to eliminate the visible emissions.

e) Reporting Requirements

(1) The permittee shall submit semiannual written reports that identify:

a. all days during which any visible particulate emissions were observed from the stack(s) for this emissions unit identified in b)(2)a.; and

b. any corrective actions taken to minimize or eliminate the visible particulate emissions.

These reports shall be submitted to the Director (the appropriate Ohio EPA District Office or local air agency) by January 31 and July 31 of each year and shall cover the previous 6-month period.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

i. $PM_{10}/PM_{2.5}$ emission limitations of 0.002 gr/dscf and the lb/hr and rolling 12-month limitations for (for $PM_{10}/PM_{2.5}$) the following process loading vents:

(a) PE Pellet Elutricator & Cyclone Separator (PE3-16):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(b) PE Pellet Elutricator & Cyclone Separator (PE4-16):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(c) PE Railcar Loading Bin (PE3-17):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(d) PE Railcar Loading Bin (PE4-17):

(i) 0.12 lb/hr and 0.19 ton per rolling 12-month period.

(e) PE Railcar Loading (PE3-18):

(i) 0.002 lb/hr and 0.003 ton per rolling 12-month period.

(f) PE Railcar Loading (PE4-18):

(i) 0.002 lb/hr and 0.003 ton per rolling 12-month period.

Applicable Compliance Method:

The 0.002 gr/dscf was established in accordance with BACT requirements as the maximum outlet concentration standard for the application of fabric filtration control.

The maximum outlet concentration 0.002 gr $PM_{10}/PM_{2.5}$/dscf for the elutricator & cyclone separator vents was established in accordance with BACT requirements.

The lb/hr and tons per rolling 12-month period limitations were established by multiplying the emission limitation of 0.002 gr/dscf by the following maximum volumetric air flow rates in cubic feet per hour (cfh) and cubic feet per year (cfyr) and multiplying by lb/7,000 gr:

(a) PE Pellet Elutricator & Cyclone Separator (PE3-16):

(i) 402,024 cfh

(ii) 1,326,326,040 cfyr

(b) PE Pellet Elutricator & Cyclone Separator (PE4-16):

(i) 402,024 cfh

(ii) 1,326,326,040 cfyr

(c) PE Railcar Loading Bin (PE3-17):

(i) 402,024 cfh

(ii) 1,326,326,040 cfyr

(d) PE Railcar Loading Bin (PE4-17):

(i) 402,024 cfh

(ii) 1,326,326,040 cfyr

(e) PE Railcar Loading (PE3-18):

(i) 5,248cfh

(ii) 17,314,961 cfyr

(f) PE Railcar Loading (PE4-18):

(i) 5,248cfh

(ii) 17,314,961 cfyr

Maximum hourly volumetric air flows are based on a pellet-to-air ratio 10 lb/lb (766 lb/lb for PE3-18 & PE4-18) and a maximum pellet loading rates of 136.4 metric tons per hour. If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

Maximum annual volumetric air flows are based on a pellet-to-air ratio of 10 lb/lb (766 lb/lb for PE3-18 & PE4-18) and a maximum pellet loading rate of 450,000 metric tons per year. Therefore, provided compliance is shown with the 0.002 gr/dscf limitation, compliance with the rolling 12-month limitations shall also be demonstrated.

b. Emissions Limitation:

Limitations of 0.001 gr/dscf for PM_{10}, 0.0005 gr/dscf for $PM_{2.5}$ and the lb/hr and rolling 12-month limitations (for PM_{10} and $PM_{2.5}$) for the pellet cleaning package vent (PE-RPC):

(a) PM_{10}: 0.009 lb/hr and 0.038 ton per rolling 12-month period;

(b) $PM_{2.5}$: 0.004 lb/hr and 0.019 ton per rolling 12-month period.

Applicable Compliance Method:

The 0.001 gr/dscf for PM_{10} and 0.0005 gr/dscf for $PM_{2.5}$ were established in accordance with BACT requirements as the maximum outlet concentration standards for the application of fabric filtration control.

The lb/hr limitations were established by multiplying the emission limitation of 0.005 gr/dscf or 0.01 gr/dscf by the following maximum volumetric air flow rates (cfm) and multiplying by lb/7,000 gr and 60 min/hr:

The lb/hr limitations were established by multiplying the emission limitation of 0.001 gr/dscf for PM_{10} and 0.0005 gr/dscf for $PM_{2.5}$ by a maximum volumetric air flow rate of 60,000 cubic feet per hour and multiplying by lb/7,000 gr.

If required, the permittee shall demonstrate compliance with the gr/dscf and lb/hr limitations in accordance with Methods 1-4 of 40 CFR Part 60, Appendix A and Methods 201, 201A and 202 of 40 CFR Part 51, Appendix M. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

The tons per rolling 12-month period limitations were established by multiplying the lb/hr limitations by a maximum operating schedule of 8,760 hours per year and dividing by 2,000 lbs/ton. Therefore, provided compliance is shown with the lb/hr limitations, compliance with the rolling 12-month limitations shall also be demonstrated.

c. Emissions Limitation:

Visible particulate emissions from the stacks for this emissions unit identified in b)(2)a. shall not exceed five percent opacity, as a six-minute average.

Applicable Compliance Method:

If required, compliance shall be demonstrated using Test Method 9 as set forth in "Appendix on Test Methods" in 40 CFR, Part 60 ("Standards of Performance for New Stationary Sources").

g) Miscellaneous Requirements

(1) None.

16. F001, Facility Roadways

Operations, Property and/or Equipment Description:

Facility roadways and parking areas; maximum of 182,865 annual vehicle miles traveled

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)c. and b)(2)c.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20	Fugitive particulate emissions (PE) shall not exceed 1.88 tons per rolling, 12-month period. Fugitive emissions of particulate matter less than 10 microns (PM_{10}) shall not exceed 0.38 ton per rolling, 12-month period. Fugitive emissions of particulate matter less than 2.5 microns ($PM_{2.5}$) shall not exceed 0.09 ton per rolling, 12-month period. No visible PE from any paved roadway or parking area except for a period of time not to exceed one minute during any 60-minute observation period. See b)(2)a. below.
b.	OAC rule 3745-31-05(A)(3), as effective 6/30/08	The requirements of this rule are equivalent to the requirements established pursuant to OAC rules 3745-31-10 through 3745-31-20. See b)(2)b. below.
c.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective 6/30/08	The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A) do not apply to the PE and

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		emissions of PM_{10} and $PM_{2.}5$ from this source since the potential to emit is less than 10 tons/year. See b)(2)c. below.
d.	OAC rules 3745-17-07(B) and 3745-17-08(B)	The requirements of these rules are less stringent than or equivalent to the emission limitations and control requirements specified in OAC rules 3745-31-10 through 3745-31-20.

(2) Additional Terms and Conditions

a. As part of the BACT determination for fugitive PE, the permittee shall:

i. Pave all in-plant haul roads and parking areas;

ii. Implement best management practices including posting and limiting vehicle speeds to 20 miles per hour and water spraying or sweeping daily. Daily water spraying or sweeping is only required when an inspection conducted in accordance with d)(1) determines an exceedance of the emissions limitations in b)(1)a. has occurred; and

iii. Comply with the visible PE limitation in b)(1)a. above.

Compliance with this limitation shall be demonstrated by the monitoring and recordkeeping required in d)(1)-(3).

b. This Best Available Technology (BAT) emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

c. This rule applies once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

c) Operational Restrictions

(1) None.

d) Monitoring and/or Recordkeeping Requirements

(1) Except as otherwise provided in this section, the permittee shall perform inspections of each of the in-plant haul roads and parking areas in accordance with the following frequencies:

paved in plant haul roadways and parking areas	minimum inspection frequency
all in plant roads and parking areas	daily

(2) The purpose of the inspections is to determine the need for implementing the control measures in b)(2)a. above. The inspections shall be performed during representative, normal traffic conditions. No inspection shall be necessary for an in-plant haul road or parking area that is covered with snow and/or ice or if precipitation has occurred that is sufficient for that day to ensure compliance with the above-mentioned applicable requirements. Any required inspection that is not performed due to any of the above-identified events shall be performed as soon as such event(s) has (have) ended.

(3) The permittee shall maintain records of the following information:

a. the date and reason any required inspection was not performed, including those inspections that were not performed due to snow and/or ice cover or precipitation;

b. the date of each inspection where it was determined by the permittee that it was necessary to implement the control measures;

c. the dates the control measures were implemented; and

d. on a calendar quarter basis, the total number of days the control measures were implemented and the total number of days where snow and/or ice cover or precipitation were sufficient to not require the control measures.

The information required in d)(3)d. shall be updated on a calendar quarter basis within 30 days after the end of each calendar quarter.

e) Reporting Requirements

(1) The permittee shall submit deviation reports that identify any of the following occurrences:

a. each day during which an inspection was not performed by the required frequency, excluding an inspection which was not performed due to an exemption for snow and/or ice cover or precipitation; and

b. each instance when a control measure, that was to be implemented as a result of an inspection, was not implemented.

The deviation reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitation:

Fugitive PE shall not exceed 1.88 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with annual emissions limitation shall be determined based on the emission factor calculations for paved roadways and parking areas in AP-42 Section 13.2.1 (1/11) and a maximum of 182,865 annual vehicle miles traveled as demonstrated by the following equation:

$EF = ((k*(sL)^{0.91} X (W)^{1.02})) X (1-P/(4 X 365))$

Where:
EF = particulate emission factor (lb/VMT)
k = particle size multiplier (lb/VMT) = 0.011
sL = road surface silt loading (g/m^2) = 0.2
W = mean vehicle weight (tons) = 8.65
P = number of rain days per year >0.01 in. = 150

Therefore, EF = 0.0206 lb/VMT

Maximum travel = 182,865 VMT/year

(182,865 VMT/year)(0.0206 lb/VMT)(1 ton/2,000 lbs) = 1.88 tons PE per rolling, 12- month period

b. Emissions Limitation:

Fugitive PM_{10} emissions shall not exceed 0.38 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with annual emissions limitation shall be determined based on the emission factor calculations for paved roadways and parking areas in AP-42 Section 13.2.1 (1/11) and a maximum of 182,865 annual vehicle miles traveled as demonstrated by the following equation:

$EF = ((k*(sL)^{0.91} X (W)^{1.02})) X (1-P/(4 X 365))$

Where:
EF = particulate emission factor (lb/VMT)
k = particle size multiplier (lb/VMT) = 0.0022
sL = road surface silt loading (g/m^2) = 0.2
W = mean vehicle weight (tons) = 8.65
P = number of rain days per year >0.01 in. = 150

Therefore, EF = 0.0041 lb/VMT

Maximum travel = 182,865 VMT/year

(182,865 VMT/year)(0.0041 lb/VMT)(1 ton/2,000 lbs) = 0.38 ton PM_{10} per rolling, 12-month period

c. Emissions Limitation:

Fugitive $PM_{2.5}$ emissions shall not exceed 0.09 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with annual emissions limitation shall be determined based on the emission factor calculations for paved roadways and parking areas in AP-42 Section 13.2.1 (1/11) and a maximum of 182,865 annual vehicle miles traveled as demonstrated by the following equation:

$EF = ((k*(sL)^{0.91} X (W)^{1.02})) X (1-P/(4 X 365))$

Where:
EF = particulate emission factor (lb/VMT)
k = particle size multiplier (lb/VMT) = 0.00054
sL = road surface silt loading (g/m^2) = 0.2
W = mean vehicle weight (tons) = 8.65
P = number of rain days per year >0.01 in. = 150

Therefore, EF = 0.0010 lb/VMT

Maximum travel = 182,865 VMT/year

(182,865 VMT/year)(0.0010 lb/VMT)(1 ton/2,000 lbs) = 0.09 ton $PM_{2.5}$ per rolling, 12-month period.

d. Emissions Limitation:

No visible PE from any paved roadway or parking area except for a period of time not to exceed one minute during any 60-minute observation period.

Applicable Compliance Method:

If required, visible PE shall be determined according to USEPA Method 22.

g) Miscellaneous Requirements

(1) None.

17. Emissions Unit Group - Firewater Pumps: P005 and P006

EU ID	Operations, Property and/or Equipment Description
P005	Firewater Pump 1 (5PK-5302A); 300 kW (402 HP) emergency diesel-fired firewater pump engine
P006	Firewater Pump 2 (5PK-5302B); 300 kW (402 HP) emergency diesel-fired firewater pump engine

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)c. and b)(2)d.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Non-methane hydrocarbon plus nitrogen oxides (NMHC + NO_x) emissions shall not exceed 4.0 g/kW-hour (3.0 g/HP-hour), 2.64 pounds per hour and 0.13 ton per rolling, 12-month period. Carbon monoxide (CO) emissions shall not exceed 3.5 g/kW-hour (2.6 g/HP-hour), 2.31 pounds per hour and 0.12 ton per rolling, 12-month period. Particulate emissions (PE), emissions of particulate matter less than 10 microns (PM_{10}) and emissions of particulate matter less than 2.5 microns ($PM_{2.5}$) shall not exceed 0.20 g/kW-hour (0.15 g/HP-hour), 0.13 pound per hour and 0.0066 ton per rolling, 12-month period. Carbon dioxide equivalent (CO_2e) emissions shall not exceed 23.0 tons per rolling, 12-month period. See b)(2)a.-b. below.
b.	OAC rule 3745-31-05(A)(3), as effective 6/30/08	The emissions limitations for NO_x, CO, VOC (NMHC) and PE/PM_{10}/$PM_{2.5}$

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		required by this rule are equivalent to the emissions limitations for NO_x, CO, VOC and PE/PM_{10}/$PM_{2.5}$ established pursuant to OAC rules 3745-31-10 through 3745-31-20. Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the CO_2e emissions from this air contaminant source pursuant to OAC rule 3745-31-34(E)(8). See b)(2)c. and c)(1) below.
c.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective 6/30/08	BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the NO_x, VOC (NMHC), CO and PE/PM_{10}/$PM_{2.5}$ emissions from this air contaminant source since the calculated annual emission rates are less than 10 tons/year taking into account the federally enforceable limits in OAC rules 3745-31-10 through 20 and 40 CFR Part 60, Subpart IIII. BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the SO_2 emissions from this air contaminant source since the potential to emit of SO_2 is less than 10 tons/year. See b)(2)d. below.
d.	OAC rule 3745-17-07(A)	Visible PE from any stack serving this emissions unit shall not exceed 20 percent opacity as a six-minute average, except as provided by rule.
e.	OAC rule 3745-17-11(B)	The emission limitation required by this rule is less stringent than the emissions limitation for PE established pursuant to OAC rules 3745-31-10 through 20.
f.	OAC rule 3745-18-06	This emissions unit is exempt from the requirements of OAC rule 3745-18-06(G) pursuant to OAC rule 3745-18-06(B).
g.	40 CFR 60, Subpart IIII (40 CFR 60.4200 – 4219) [In accordance with 40 CFR	The requirements of this rule are equivalent to the requirements of OAC rules 3745-31-10 through 20.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	60.4200(a)(2)(ii) and 60.4205(c), this emissions unit is a 300 kW (402 HP) fire pump compression ignition (CI) internal combustion engine (ICE) manufactured after July 1, 2006 with a displacement of less than 30 liters per cylinder subject to the emissions limitations/control measures specified in this section.]	[40 CFR 60.4205(c) and Table 4 to 40 CFR Part 60, Subpart IIII] See b)(2)e. and c)(2) below.
h.	40 CFR 60.1 – 19 (40 CFR 60.4218)	Table 8 of Subpart IIII of 40 CFR Part 60 – Applicability of General Provisions to Subpart IIII, specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart.
i.	40 CFR 63, Subpart ZZZZ (40 CFR 63.6580 – 6675) [In accordance with 40 CFR 63.6585, 63.6590(a)(2)(ii) and 63.6590(c)(6), this emissions unit is an emergency stationary reciprocating internal combustion engine (RICE) with a site rating of less than 500 brake HP located at a major source of hazardous air pollutant (HAP) emissions for which construction commenced after June 12, 2006.]	New emergency stationary RICE with site rating of less than or equal to 500 HP located at a major source of HAP emissions must meet the requirements of this part by meeting the requirements of 40 CFR Part 60, Subpart IIII. No further requirements apply for such engines under this part. [40 CFR 63.6590(c)(6)]
j.	40 CFR 63.1 – 16 (40 CFR 63.6665)	Table 8 of Subpart ZZZZ of 40 CFR Part 63 – Applicability of General Provisions to Subpart ZZZZ, specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart.

(2) Additional Terms and Conditions

a. As part of the Best Available Control Technology (BACT) determination for NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$, this emissions unit shall be certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual, and shall not operate more than 100 hours per year of non-emergency use. Compliance with these requirements shall be demonstrated by compliance with the short-term NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$ emission limitations in b)(1)a.

b. As part of the BACT determination for CO_2e, the permittee must implement good operating practices (proper maintenance and operation) and shall not operate more than 100 hours per year of non-emergency use. Compliance with these requirements shall be demonstrated by compliance with the CO_2e emissions limitation in b)(1)a.

c. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

d. This rule applies once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

e. The permittee must comply with the applicable emission and operating limitations of 40 CFR Part 60, Subpart IIII upon startup.

c) Operational Restrictions

(1) The permittee shall burn only low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight) in this emissions unit.

(2) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall maintain records of the following information each month:

a. the hours of non-emergency operation for this emissions unit; and

b. beginning after the first 12 calendar months of operation or the first 12 calendar months following the issuance of this permit, the rolling, 12-month summation of the non-emergency operating hours for this emissions unit.

(2) For each day during which the permittee burns a fuel other than low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight), the permittee shall maintain a record of the type and quantity of fuel burned in this emissions unit.

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the following:

a. Any exceedences of the 100 hours per year limitation per emission unit on non-emergency operating hours; and

b. Any exceedences of the rolling, 12-month emissions limitations for NMHC + NO_x, CO, PE/PM_{10}/$PM_{2.5}$ and CO_2e.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) The permittee shall submit deviation (excursion) reports that identify each day when a fuel other than low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight) was burned in this emissions unit. Each report shall be submitted within 30 days after the deviation occurs.

(3) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

NMHC + NO_x emissions shall not exceed 4.0 g/kW-hour (3.0 g/HP-hour), 2.64 pounds per hour and 0.14 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

NMHC + NO_x (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X NMHC + NO_x emissions limitation, in pounds per hour X 1 ton/2,000 pounds

b. Emissions Limitations:

CO emissions shall not exceed 3.5 g/kW-hour (2.6 g/HP-hour), 2.31 pounds per hour and 0.12 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

CO (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X CO emissions limitation, in pounds per hour X 1 ton/2,000 pounds

c. Emissions Limitations:

PE and emissions of PM_{10} and $PM_{2.5}$ shall not exceed 0.20 g/kW-hour (0.15 g/HP-hour), 0.13 pound per hour and 0.0066 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

$PE/PM_{10}/PM_{2.5}$ (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X $PE/PM_{10}/PM_{2.5}$ emissions limitation, in pounds per hour X 1 ton/2,000 pounds

d. Emissions Limitation:

CO_2e emissions shall not exceed 23.0 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

CO_2e (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X CO_2e emissions factor of 458 pounds per hour, calculated from the emissions factors from 40 CFR Part 98, Tables C-1 and C-2 and global warming potentials in 40 CFR Part 98, Table A-1 X 1 ton/2,000 pounds

e. Emissions Limitation:

Visible PE from any stack serving this emissions unit shall not exceed 20 percent opacity as a six-minute average, except as provided by rule.

Applicable Compliance Method:

If required, visible PE shall be determined according to USEPA Method 9.

(2) Pursuant to 40 CFR 60.4211(g)(2), if the permittee does not install, configure, operate and maintain this emissions unit according to the manufacturer's emission-related written instructions, or if the permittee changes emission-related settings in a way that is

not permitted by the manufacturer, compliance must be demonstrated by conducting the initial performance test in accordance with the following requirements:

a. An initial performance test shall be performed to demonstrate compliance with the mass emissions limitations in b)(1)a. and g. for NMHC + NO_X, CO and $PE/PM_{10}/PM_{2.5}$, within one year of startup, or within one year after the emissions unit is no longer installed, configured, operated and maintained in accordance with the manufacturer's emission-related written instructions, or within one year after the permittee changes emission-related settings in a way not permitted by the manufacturer.

b. The test method(s) in 40 CFR 60.4212 shall be employed to demonstrate compliance with the allowable mass emission rates. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

c. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the Ohio EPA, Southeast District Office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA, Southeast District Office's refusal to accept the results of the emission test(s).

d. Personnel from the Ohio EPA, Southeast District Office shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

e. A comprehensive written report on the results of the emission test(s) shall be signed by the person or persons responsible for the tests and submitted to the Ohio EPA, Southeast District Office within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the Ohio EPA, Southeast District Office.

g) Miscellaneous Requirements

(1) None.

18. P007, Emergency Diesel-fired Generator Engine (5GE-6401A)

Operations, Property and/or Equipment Description:

2,500 kW (3,353 HP) emergency diesel-fired generator engine

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)c. and b)(2)d.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 3745-31-20 and 3745-31-34	Non-methane hydrocarbon plus nitrogen oxides (NMHC + NO_x) emissions shall not exceed 6.4 g/kW-hour (4.8 g/HP-hour), 37.41 pounds per hour and 1.87 tons per rolling, 12-month period. Carbon monoxide (CO) emissions shall not exceed 3.5 g/kW-hour (2.6 g/HP-hour), 19.25 pounds per hour and 0.96 ton per rolling, 12-month period. Particulate emissions (PE), emissions of particulate matter less than 10 microns (PM_{10}) and emissions of particulate matter less than 2.5 microns ($PM_{2.5}$) shall not exceed 0.20 g/kW-hour (0.15 g/HP-hour), 1.1 pounds per hour and 0.055 ton per rolling, 12-month period. Carbon dioxide equivalent (CO_2e) emissions shall not exceed 200.0 tons per rolling, 12-month period. See b)(2)a.-b. below.
b.	OAC rule 3745-31-05(A)(3), as effective 6/30/08	The emissions limitations for NO_x, CO, VOC (NMHC) and PE/PM_{10}/$PM_{2.5}$ required by this rule are equivalent to the emissions limitations for NO_x, CO, VOC (NMHC) and PE/PM_{10}/$PM_{2.5}$ established

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
		pursuant to OAC rules 3745-31-10 through 3745-31-20. Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the CO_2e emissions from this air contaminant source pursuant to OAC rule 3745-31-34(E)(8). See b)(2)c. and c)(1) below.
c.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective 6/30/08	BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the NO_x, VOC (NMOC), CO and PE/PM_{10}/$PM_{2.5}$ emissions from this air contaminant source since the calculated annual emission rates are less than 10 tons/year taking into account the federally enforceable limits in OAC rules 3745-31-10 through 20 and 40 CFR Part 60, Subpart IIII. BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the SO_2 emissions from this air contaminant source since the potential to emit of SO_2 is less than 10 tons/year. See b)(2)d. below.
d.	OAC rule 3745-17-07(A)	The emission limitation required by this rule is less stringent than the emissions limitation for PE established pursuant to 40 CFR Part 60, Subpart IIII.
e.	OAC rule 3745-17-11(B)	The emission limitation required by this rule is less stringent than the emissions limitation for PE established pursuant to OAC rules 3745-31-10 through 20.
f.	OAC rule 3745-18-06	This emissions unit is exempt from the requirements of OAC rule 3745-18-06(G) pursuant to OAC rule 3745-18-06(B).
g.	40 CFR 60, Subpart IIII (40 CFR 60.4200 – 4219) [In accordance with 40 CFR 60.4200(a)(2)(i) and 60.4205(b), this emissions unit is a 2,500 kW (3,353 HP) emergency stationary	The emissions limitations required by this rule for NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$ are equivalent to the emissions limitations required by OAC rules 3745-31-10 through 20 for NMHC, NO_x, CO and PE/PM_{10}/$PM_{2.5}$.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	compression ignition (CI) internal combustion engine (ICE) manufactured after April 1, 2006 with a displacement of less than 30 liters per cylinder subject to the emissions limitations/control measures specified in this section.]	Exhaust opacity from CI RICE must not exceed: 20 percent during the acceleration mode; 15 percent during the lugging mode; and 50 percent during the peaks in either the acceleration or lugging modes. [40 CFR 60.4205(b), 40 CFR 60.4202(a)(2), 40 CFR 89.112 and 40 CFR 89.113] See b)(2)e. and c)(2) below.
h.	40 CFR 60.1 – 19 (40 CFR 60.4218)	Table 8 of Subpart IIII of 40 CFR Part 60 – Applicability of General Provisions to Subpart IIII, specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart.
i.	40 CFR 63, Subpart ZZZZ (40 CFR 63.6580 – 6675) [In accordance with 40 CFR 63.6585, 63.6590(a)(2)(i) and 63.6590(b)(1)(i), this emissions unit is an emergency stationary reciprocating internal combustion engine (RICE) with a site rating of more than 500 brake HP located at a major source of hazardous air pollutant (HAP) emissions for which construction commenced after December 19, 2002.]	See e)(5) below.
j.	40 CFR 63.1 – 16 (40 CFR 63.6665)	Table 8 of Subpart ZZZZ of 40 CFR Part 63 – Applicability of General Provisions to Subpart ZZZZ, specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart.

(2) Additional Terms and Conditions

a. As part of the Best Available Control Technology (BACT) determination for NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$, this emissions unit shall be certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual and

shall not operate more than 100 hours per year of non-emergency use. Compliance with these requirements shall be demonstrated by compliance with the short-term NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$ emission limitations in b)(1)a.

b. As part of the BACT determination for CO_2e, the permittee must implement good operating practices (proper maintenance and operation) and shall not operate more than 100 hours per year of non-emergency use. Compliance with this requirement shall be demonstrated by compliance with the CO_2e emissions limitation in b)(1)a.

c. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

d. This rule applies once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

e. The permittee must comply with the applicable emission and operating limitations of 40 CFR Part 60, Subpart IIII upon startup.

c) Operational Restrictions

(1) The permittee shall burn only low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight) in this emissions unit.

(2) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall maintain records of the following information each month:

a. the hours of non-emergency operation for this emissions unit; and

b. beginning after the first 12 calendar months of operation or the first 12 calendar months following the issuance of this permit, the rolling, 12-month summation of the non-emergency operating hours for this emissions unit.

(2) For each day during which the permittee burns a fuel other than low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight), the permittee shall maintain a record of the type and quantity of fuel burned in this emissions unit.

(3) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the following:

a. Any exceedences of the 100 hours per year limitation per emission unit on non-emergency operating hours; and

b. Any exceedences of the rolling, 12-month emissions limitations for NMHC, NO_x, CO, PE/PM_{10}/$PM_{2.5}$ and CO_2e.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) The permittee shall submit deviation (excursion) reports that identify each day when a fuel other than low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight) was burned in this emissions unit. Each report shall be submitted within 30 days after the deviation occurs.

(3) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

(4) See 40 CFR Part 60, Subpart ZZZZ (40 CFR 63.6580 – 6675).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

NMHC + NO_x emissions shall not exceed 6.4 g/kW-hour (4.8 g/HP-hour), 37.41 pounds per hour and 1.87 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

NMHC + NO_x (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X NMHC + NO_x emissions limitation, in pounds per hour X 1 ton/2,000 pounds

b. Emissions Limitations:

CO emissions shall not exceed 3.5 g/kW-hour (2.6 g/HP-hour), 19.25 pounds per hour and 0.96 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

CO (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X CO emissions limitation, in pounds per hour X 1 ton/2,000 pounds

c. Emissions Limitations:

PE and emissions of PM_{10} and $PM_{2.5}$ shall not exceed 0.2 g/kW-hour (0.15 g/HP-hour), 1.1 pounds per hour and 0.055 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

$PE/PM_{10}/PM_{2.5}$ (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X $PE/PM_{10}/PM_{2.5}$ emissions limitation, in pounds per hour X 1 ton/2,000 pounds

d. Emissions Limitation:

CO_2e emissions shall not exceed 200.0 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

CO_2e (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X CO_2e emissions factor of 4,000 pounds per hour, calculated from the emissions factors from 40 CFR Part 98, Tables C-1 and C-2 and global warming potentials in 40 CFR Part 98, Table A-1 X 1 ton/2,000 pounds

e. Emissions Limitation:

Exhaust opacity from CI RICE must not exceed:

20 percent during the acceleration mode;
15 percent during the lugging mode; and
50 percent during the peaks in either the acceleration or lugging modes.

Applicable Compliance Method:

If required, visible PE shall be determined according to USEPA Method 9. See f)(2) below.

(2) Pursuant to 40 CFR 60.4211(g)(3) and 89.113(b), if the permittee does not install, configure, operate and maintain this emissions unit according to the manufacturer's emission-related written instructions, or if the permittee changes emission-related settings in a way that is not permitted by the manufacturer, compliance must be demonstrated by conducting performance tests in accordance with the following requirements:

a. An initial performance test shall be performed to demonstrate compliance with the mass emissions limitations in b)(1)a. and g. for NMHC, NO_X, CO, PE/PM_{10}/$PM_{2.5}$ and exhaust opacity within one year of startup, or within one year after the emissions unit is no longer installed, configured, operated and maintained in accordance with the manufacturer's emission-related written instructions, or within one year after the permittee changes emission-related settings in a way not permitted by the manufacturer. Thereafter, subsequent performance testing must be conducted every 8,760 hours of engine operation or three years, whichever comes first.

b. The test method(s) in 40 CFR 60.4212 shall be employed to demonstrate compliance with the allowable mass emission rates. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

c. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the Ohio EPA, Southeast District Office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA, Southeast District Office's refusal to accept the results of the emission test(s).

d. Personnel from the Ohio EPA, Southeast District Office shall be permitted to witness the test(s), examine the testing equipment, and acquire data and information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

e. A comprehensive written report on the results of the emission test(s) shall be signed by the person or persons responsible for the tests and submitted to the Ohio EPA, Southeast District Office within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the Ohio EPA, Southeast District Office.

g) Miscellaneous Requirements

(1) None.

19. Emissions Unit Group - 1,000 kW Emergency Generators: P008 - P010

EU ID	Operations, Property and/or Equipment Description
P008	ECU Generator 1 (5GE-6401B); 1,000 kW (1,341 HP) emergency diesel-fired generator engine
P009	PE 1&2 Generator (5GE-6401C); 1,000 kW (1,341 HP) emergency diesel-fired generator engine
P010	PE 3&4 Generator (5GE-6401D); 1,000 kW (1,341 HP) emergency diesel-fired generator engine

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only:

(1) b)(1)c. and b)(2)d.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rules 3745-31-10 through 20 and 3745-31-34	Non-methane hydrocarbon plus nitrogen oxides (NMHC + NO_x) emissions shall not exceed 6.4 g/kW-hour (4.8 g/HP-hour), 14.96 pounds per hour and 0.75 ton per rolling, 12-month period. Carbon monoxide (CO) emissions shall not exceed 3.5 g/kW-hour (2.6 g/HP-hour), 7.70 pounds per hour and 0.39 ton per rolling, 12-month period. Particulate emissions (PE), emissions of particulate matter less than 10 microns (PM_{10}) and emissions of particulate matter less than 2.5 microns ($PM_{2.5}$) shall not exceed 0.2 g/kW-hour (0.15 g/HP-hour), 0.44 pound per hour and 0.022 ton per rolling, 12-month period. Carbon dioxide equivalent (CO_2e) emissions shall not exceed 80.0 tons per rolling, 12-month period. See b)(2)a.-b. below.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
b.	OAC rule 3745-31-05(A)(3), as effective 6/30/08	The emissions limitations for NO_x, CO, VOC (NMHC) and $PE/PM_{10}/PM_{2.5}$ required by this rule are equivalent to the emissions limitations for NO_x, CO, VOC (NMHC) and $PE/PM_{10}/PM_{2.5}$ established pursuant to OAC rules 3745-31-10 through 3745-31-20. Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the CO_2e emissions from this air contaminant source pursuant to OAC rule 3745-31-34(E)(8). See b)(2)c. and c)(1) below.
c.	OAC rule 3745-31-05(A)(3)(a)(ii), as effective 6/30/08	BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the NO_x, VOC (NMHC), CO and $PE/PM_{10}/PM_{2.5}$ emissions from this air contaminant source since the calculated annual emission rates are less than 10 tons/year taking into account the federally enforceable limits in OAC rules 3745-31-10 through 20 and 40 CFR Part 60, Subpart IIII. BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to the SO_2 emissions from this air contaminant source since the potential to emit of SO_2 is less than 10 tons/year. See b)(2)d. below.
d.	OAC rule 3745-17-07(A)	The emission limitation required by this rule is less stringent than the emissions limitation for PE established pursuant to 40 CFR Part 60, Subpart IIII.
e.	OAC rule 3745-17-11(B)	The emission limitation required by this rule is less stringent than the emissions limitation for PE established pursuant to OAC rules 3745-31-10 through 20.
f.	OAC rule 3745-18-06	This emissions unit is exempt from the requirements of OAC rule 3745-18-06(G) pursuant to OAC rule 3745-18-06(B).
g.	40 CFR 60, Subpart IIII (40 CFR 60.4200 – 4219)	The emissions limitations required by this rule for NMHC, NO_x, CO and

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	[In accordance with 40 CFR 60.4200(a)(2)(i) and 60.4205(b), this emissions unit is a 1,000 kW (1,341 HP) emergency stationary compression ignition (CI) internal combustion engine (ICE) manufactured after April 1, 2006 with a displacement of less than 30 liters per cylinder subject to the emissions limitations/control measures specified in this section.]	$PE/PM_{10}/PM_{2.5}$ are equivalent to the emissions limitations required by OAC rules 3745-31-10 through 20 for NMHC + NO_x, CO and $PE/PM_{10}/PM_{2.5}$. Exhaust opacity from CI RICE must not exceed: 20 percent during the acceleration mode; 15 percent during the lugging mode; and 50 percent during the peaks in either the acceleration or lugging modes. [40 CFR 60.4205(b), 40 CFR 60.4202(a)(2), 40 CFR 89.112 and 40 CFR 89.113] See b)(2)e. and c)(2) below.
h.	40 CFR 60.1 – 19 (40 CFR 60.4218)	Table 8 of Subpart IIII of 40 CFR Part 60 – Applicability of General Provisions to Subpart IIII, specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart.
i.	40 CFR 63, Subpart ZZZZ (40 CFR 63.6580 – 6675) [In accordance with 40 CFR 63.6585, 63.6590(a)(2)(i) and 63.6590(b)(1)(i), this emissions unit is an emergency stationary reciprocating internal combustion engine (RICE) with a site rating of more than 500 brake HP located at a major source of hazardous air pollutant (HAP) emissions for which construction commenced after December 19, 2002.]	See e)(5) below.
j.	40 CFR 63.1 – 16 (40 CFR 63.6665)	Table 8 of Subpart ZZZZ of 40 CFR Part 63 – Applicability of General Provisions to Subpart ZZZZ, specifies the provisions of Subpart A that apply to owners and operators of affected facilities subject to this subpart.

(2) Additional Terms and Conditions

a. As part of the Best Available Control Technology (BACT) determination for NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$, this emissions unit shall be certified to the meet the emissions standards in Table 4 of 40 CFR Part 60, Subpart IIII, shall employ good combustion practices per the manufacturer's operating manual, and shall not operate more than 100 hours per year of non-emergency use. Compliance with these requirements shall be demonstrated by compliance with the short-term NMHC + NO_x, CO and PE/PM_{10}/$PM_{2.5}$ emission limitations in b)(1)a.

b. As part of the BACT determination for CO_2e, the permittee must implement good operating practices (proper maintenance and operation) and shall not operate more than 100 hours per year of non-emergency use. Compliance with this requirement shall be demonstrated by compliance with the CO_2e emissions limitation in b)(1)a.

c. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

d. This rule applies once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

e. The permittee must comply with the applicable emission and operating limitations of 40 CFR Part 60, Subpart IIII upon startup.

c) Operational Restrictions

(1) The permittee shall burn only low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight) in this emissions unit.

(2) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall maintain records of the following information each month:

a. the hours of non-emergency operation for this emissions unit; and

b. beginning after the first 12 calendar months of operation or the first 12 calendar months following the issuance of this permit, the rolling, 12-month summation of the non-emergency operating hours for this emissions unit.

(2) For each day during which the permittee burns a fuel other than low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight), the permittee shall maintain a record of the type and quantity of fuel burned in this emissions unit.

(3) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the following:

a. Any exceedences of the 100 hours per year limitation per emission unit on non-emergency operating hours; and

b. Any exceedences of the rolling, 12-month emissions limitations for NMHC, NO_x, CO, PE/PM_{10}/$PM_{2.5}$ and CO_2e.

The quarterly deviation (excursion) reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) The permittee shall submit deviation (excursion) reports that identify each day when a fuel other than low-sulfur diesel fuel with a sulfur content of less than 15 ppm (0.0015 percent by weight) was burned in this emissions unit. Each report shall be submitted within 30 days after the deviation occurs.

(3) See 40 CFR Part 60, Subpart IIII (40 CFR 60.4200 – 4219).

(4) See 40 CFR Part 63, Subpart ZZZZ (40 CFR 63.6580 – 6675).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

NMHC + NO_x emissions shall not exceed 6.4 g/kW-hour (4.8 g/HP-hour), 14.96 pounds per hour and 0.75 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

NMHC + NOx (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X NMHC + NO_x emissions limitation, in pounds per hour X 1 ton/2,000 pounds

b. Emissions Limitations:

CO emissions shall not exceed 3.5 g/kW-hour (2.6 g/HP-hour), 7.70 pounds per hour and 0.39 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

CO (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X CO emissions limitation, in pounds per hour X 1 ton/2,000 pounds

c. Emissions Limitations:

PE and emissions of PM_{10} and $PM_{2.5}$ shall not exceed 0.2 g/kW-hour (0.15 g/HP-hour), 0.44 pound per hour and 0.022 ton per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the short-term emissions limitations shall be based on the manufacturer's certification to the standards applicable to this emissions unit and by maintaining the engine according to the manufacturer's specifications. See f)(2) below.

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

$PE/PM_{10}/PM_{2.5}$ (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X $PE/PM_{10}/PM_{2.5}$ emissions limitation, in pounds per hour X 1 ton/2,000 pounds

d. Emissions Limitation:

CO_2e emissions shall not exceed 80.0 tons per rolling, 12-month period.

Applicable Compliance Method:

Compliance with the rolling, 12-month emissions limitation shall be demonstrated based on the following calculation:

CO_2e (tons per rolling, 12-month period) =

hours of operation per rolling, 12-month period, as recorded in d)(1)(b) X CO_2e emissions factor of 1,600 pounds per hour, calculated from the emissions factors from 40 CFR Part 98, Tables C-1 and C-2 and global warming potentials in 40 CFR Part 98, Table A-1 X 1 ton/2,000 pounds

e. Emissions Limitation:

Exhaust opacity from CI RICE must not exceed:

20 percent during the acceleration mode;
15 percent during the lugging mode; and
50 percent during the peaks in either the acceleration or lugging modes.

Applicable Compliance Method:

If required, visible PE shall be determined according to USEPA Method 9. See f)(2) below.

(2) Pursuant to 40 CFR 60.4211(g)(3) and 89.113(b), if the permittee does not install, configure, operate and maintain this emissions unit according to the manufacturer's emission-related written instructions, or if the permittee changes emission-related settings in a way that is not permitted by the manufacturer, compliance must be demonstrated by conducting performance tests in accordance with the following requirements:

a. An initial performance test shall be performed to demonstrate compliance with the mass emissions limitations in b)(1)a. and g. for NMHC, NO_X, CO, PE/PM_{10}/$PM_{2.5}$ and exhaust opacity within one year of startup, or within one year after the emissions unit is no longer installed, configured, operated and maintained in accordance with the manufacturer's emission-related written instructions, or within one year after the permittee changes emission-related settings in a way not permitted by the manufacturer. Thereafter, subsequent performance testing must be conducted every 8,760 hours of engine operation or three years, whichever comes first.

b. The test method(s) in 40 CFR 60.4212 shall be employed to demonstrate compliance with the allowable mass emission rates. Alternative U.S. EPA approved test methods may be used with prior approval from the Ohio EPA.

c. Not later than 30 days prior to the proposed test date(s), the permittee shall submit an "Intent to Test" notification to the Ohio EPA, Southeast District Office. The "Intent to Test" notification shall describe in detail the proposed test methods and procedures, the emissions unit operating parameters, the time(s) and date(s) of the test(s), and the person(s) who will be conducting the test(s). Failure to submit such notification for review and approval prior to the test(s) may result in the Ohio EPA, Southeast District Office's refusal to accept the results of the emission test(s).

d. Personnel from the Ohio EPA, Southeast District Office shall be permitted to witness the test(s), examine the testing equipment, and acquire data and

information necessary to ensure that the operation of the emissions unit and the testing procedures provide a valid characterization of the emissions from the emissions unit and/or the performance of the control equipment.

e. A comprehensive written report on the results of the emission test(s) shall be signed by the person or persons responsible for the tests and submitted to the Ohio EPA, Southeast District Office within 30 days following completion of the test(s). The permittee may request additional time for the submittal of the written report, where warranted, with prior approval from the Ohio EPA, Southeast District Office.

g) Miscellaneous Requirements

(1) None.

20. P011, Cooling Tower (5E-5201)

Operations, Property and/or Equipment Description:

Multi-cell, induced-draft, counter-flow evaporative cooling tower with side stream filtration system and high efficiency mist/drift eliminator

a) The following emissions unit terms and conditions are federally enforceable with the exception of those listed below which are enforceable under state law only.

(1) b)(1)d., b)(2)e. and b)(2)f.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-10 through 3745-31-20	Best Available Control Technology (BACT) for volatile organic compounds (VOC), particulate emissions (PE), particulate matter 10 microns or less in size (PM_{10}) and particulate matter 2.5 microns or less in size ($PM_{2.5}$). See b)(2)a.
b.	ORC 3704.03(T)	Best Available Technology (BAT) for VOC See b)(2)b.
c.	OAC rule 3745-31-05(A)(3) June 30, 2008	See b)(2)c. and b)(2)d.
d.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)e. and b)(2)f.
e.	OAC rule 3745-17-11	See b)(2)g.
f.	OAC rule 3745-17-07(A)	See b)(2)h.
g.	OAC rule 3745-21-07	See b)(2)i.
h.	40 CFR Part 63, Subpart F (40CFR 63.100 – 63.107) [In accordance with 40 CFR 63.101 this emissions unit is a heat exchange system subject to requirements in §63.104]	Heat exchange system requirements [40 CFR 63.104] See c)(2), d)(6), and e)(4).
i.	40 CFR Part 63, Subpart XX (40 CFR 63.1080 – 63.1090 and	Leak monitoring and repair for cooling water [40 CFR 63.1085]

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
	63.1097) [In accordance with 40 CFR 63.1083 and 63.1093, this emissions unit involves heat exchange systems subject to the requirements specified in this section.]	See c)(1), d)(5), and e)(3).
j.	40 CFR Part 63, Subpart YY (40 CFR 63.1100 – 63.1114) In accordance with 40 CFR 63.1100, this emissions unit involves heat exchange systems subject to the requirements specified in this section.]	Comply with the heat exchange system requirements of 40 CFR Part 63, Subpart XX [40 CFR 63.1103]
k.	40 CFR Part 63, Subpart A (40 CFR 63.1-16)	All of the General Provisions of 40 CFR Part 63, Subpart A apply except as indicated: The provisions of §63.1 to §63.16 do not apply to 40 CFR Part 63, Subpart XX except as specified in 40 CFR Part 63, Subpart YY [§63.1083]

(2) Additional Terms and Conditions

a. The permittee shall employ BACT for this emissions unit. BACT has been determined to be the following:

i. for emissions of particulate matter (PE, PM_{10}, and $PM_{2.5}$):

(a) use of high efficiency drift eliminator designed to achieve a 0.0005% drift rate;

(b) maintenance of a total dissolved solids (TDS) content not to exceed 2,000 ppm in the circulating cooling water based on a rolling 12-month average;

(c) 5.07 tons PE per rolling 12-month period;

(d) 3.22 tons PM_{10} per rolling 12-month period; and

(e) 0.01 ton $PM_{2.5}$ per rolling 12-month period.

ii. for VOC emissions:

(a) VOC content in cooling water shall not exceed a concentration of 0.7 lb/MMgal;

(b) Compliance with heat exchange leak monitoring and repair requirements for affected ethylene manufacturing process units contained in 40 CFR Part 63 Subpart XX has been determined to be representative of BACT; and

(c) 42.55 tons per rolling 12-month period.

b. BAT requirements for VOC emissions under ORC 3704.03(T) have been determined to be compliance with the emission limitation and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

c. BAT requirements for PM_{10} and $PM_{2.5}$ under OAC rule 3745-31-05(A)(3) have been determined to be compliance with the emission limitations and requirements established pursuant to OAC rule 3745-31-10 through 3745-31-20.

d. This BAT emission limit applies until U.S. EPA approves Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) into the Ohio State Implementation Plan (SIP).

e. The BAT requirements under OAC rule 3745-31-05(A)(3) do not apply to emissions of $PM_{10}/PM_{2.5}$, from this air contaminant source since the potential to emit is less than 10 tons/year (taking into account the federally enforceable BACT requirements when applicable). It should be noted that emissions of PE are not subject to BAT under OAC rule 3745-31-05(A)(3).

f. These requirements apply once U.S. EPA approves OAC paragraph 3745-31-05(A)(3)(a)(ii) (the less than 10 tons per year BAT exemption) as part of the Ohio SIP.

g. This emissions unit is not subject to the “restrictions on particulate emissions from industrial processes” contained in OAC rule 3745-17-11. Particulate matter emitted from the cooling tower is not measurable by applicable test methods in 40 CFR Part 60, Appendix A and therefore the emissions of particulate matter do not meet the definition of “Particulate emissions” in OAC rule 3745-17-01.

h. This emissions unit is exempt from the visible emission limitation specified in OAC rule 3745-17-07(A), pursuant to OAC rule 3745-17-07(A)(3)(h), because the emissions unit is not subject to the requirements of OAC rule 3745-17-11.

i. The requirements of OAC rule 3745-21-07 are not applicable to this emissions unit in accordance with OAC rule 3745-21-07(M)(3)(c).

c) Operational Restrictions

(1) See 40 CFR Part 63, Subpart XX (40 CFR 63. 63.1080 – 63.1090 and 63.1097).

(2) See 40 CFR Part 63, Subpart F (40 CFR 63.100 – 63.107).

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall measure the TDS content (in ppm) of the circulating cooling water on a monthly basis using EPA Method 160.1. Other methods may be used upon approval from Ohio EPA.

(2) The permittee shall determine the VOC content (in lbs/MMgal) of the circulating cooling water using applicable methodologies contained in 40 CFR Part 136. The frequency for VOC content determination shall be consistent with the monitoring frequency requirements outlined in 40 CFR Part 63 Subpart XX.

(3) The permittee shall maintain monthly records of the following information for the circulating cooling water:

a. the monthly TDS content, in ppm;

b. the average TDS content, in ppm, based on a rolling, 12-month average.

(4) The permittee shall maintain monthly/quarterly records as applicable of the VOC content of the circulating cooling water, in lbs/MMgal.

(5) See 40 CFR Part 63, Subpart XX (40 CFR 63. 63.1080 – 63.1090 and 63.1097).

(6) See 40 CFR Part 63, Subpart F (40 CFR 63.100 – 63.107).

e) Reporting Requirements

(1) The permittee shall submit quarterly deviation (excursion) reports that identify the following:

a. any record which shows that the average TDS content of the circulating cooling water exceeds 2,000 ppm (based on a rolling, 12-month average); and

b. any record which shows that the VOC content of the circulating cooling water exceeds 0.7 lb/MMgal.

The quarterly deviation reports shall be submitted in accordance with the reporting requirements of the Standard Terms and Conditions of this permit.

(2) See 40 CFR Part 63, Subpart XX (40 CFR 63. 63.1080 – 63.1090 and 63.1097).

(3) See 40 CFR Part 63, Subpart F (40 CFR 63.100 – 63.107).

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emissions Limitations:

Annual emissions shall not exceed:

PE- 5.07 tons per rolling 12-month period;

PM_{10} – 3.22 tons per rolling 12-month period; and

$PM_{2.5}$ - 0.01 ton per rolling 12-month period.

Applicable Compliance Method:

Compliance with the annual emission limitation is demonstrated based upon the following calculation:

$$Ei = (0.000005)\left(\frac{\%\text{DMi}}{100}\right)\left(\frac{2{,}000}{1{,}000{,}000}\right)\left(\frac{8.34\ \text{lbs}}{gal}\right)\left(\frac{13.878\ \text{MMgal}}{hour}\right)\left(\frac{8{,}760\ hrs}{\text{year}*}\right)\left(\frac{Ton}{2{,}000\ \text{lbs}}\right)$$

Where:

E_i = total tons of particulate matter per rolling 12-month period, i (i = PE, PM_{10}, $PM_{2.5}$)

0.000005 = maximum drift loss of 0.0005%

$\%DM_i$ = percent of total drift mass** for particulate size i

$\%DM_i$ = 100% for total particulate emissions (PE)

$\%DM_i$ = 9.7% for emissions of PM_{10}

$\%DM_i$ = 0.11% for emissions of $PM_{2.5}$

2,000/1,000,000 = maximum TDS content in ppm in circulating cooling water.

8.34 lbs/gal = density of water.

13.878 MMgal/hour = maximum cooling water recirculation rate.

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period.

*year = rolling 12-month period.

**The percent mass of the total drift for PM_{10} and $PM_{2.5}$ was determined by "Calculating Realistic PM10 emission from Cooling Towers", Joel Reisman and Gordon Frisbie, Greystone Environmental Consultants, Sacramento, CA (July 2002).

If required, the permittee shall submit a testing proposal that will demonstrate that the maximum drift loss does not exceed 0.0005%.

b. Emission Limitation:

VOC emissions shall not exceed 42.55 tons per rolling 12-month period.

Applicable Compliance Method:

The annual emission limitation was developed in accordance with the following calculation*:

$$E = \left(\frac{0.7 \text{ lb VOC}}{MMgal}\right)\left(\frac{13.878 \text{ MMgal}}{hour}\right)\left(\frac{8{,}760\ hrs}{\text{year} **}\right)\left(\frac{Ton}{2{,}000 \text{ lbs}}\right)$$

Where:

E = total tons of VOC per rolling 12-month period

0.7 lb VOC/MMgal = maximum concentration of VOC in circulating cooling water.

14.40 MMgal/hour = maximum cooling water recirculation rate.

8,760 hrs/yr = maximum annual operating schedule in rolling 12-month period.

*Calculation conservatively assumes a 100% emission rate of all VOC contained circulating cooling water.

**year = rolling 12-month period.

Therefore, provided compliance is shown with the maximum concentration of VOC in the circulating cooling water, compliance with the annual emission limitation shall also be demonstrated.

g) Miscellaneous Requirements

(1) None.